ENGINEERING LIBRARY

ANNUAL REVIEW and CONVENTION NUMBER

MAR 5 1948

Paper TRADE JOURNAL

REG. U. S. PAT. OFF.

VOLUME 126, No. 9 FEBRUARY 26, 1948

WOOD PULP

G

Established 1886

"Nothing great was ever achieved without enthusiasm."

EMERSON

And what more suitable object for enthusiasm than the giant Pulp and Paper Industry!

The children of the pioneers, in the spirit of their sires, blend their creative energies with nature's bounty to produce mountains of paper enriching the entire American scene.

Our enthusiasm projects itself into the future, seeing further great strides in quality, production and worldwide consumption of paper and paper products made in America.

GOTTESMAN & COMPANY

— INCORPORATED —

22 EAST 40th STREET • NEW YORK 16, N. Y.

EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

Get the pump with all these features:

1. Pump and motor in ONE rigid frame, on ONE shaft, to eliminate alignment troubles.

2. Drip-proof motor specially designed by Allis-Chalmers for efficient pumping service.

3. Bronze wearing rings easily and economically replaceable for long pump life.

4. Generous packing — five or more rings, reduce leakage and frequent servicing.

5. Plastic water seal gives positive control, and requires a minimum of attention.

THE *Electrifugal* PUMP

QUICK INSTALLATION — It's a complete, low-cost pumping "package" — ready to hook up and put into service for a wide range of applications. Can be mounted in any position — fits into close quarters. Made to handle most liquids, with capacities from 15 to 1400 gpm, heads to 500 ft.

HIGH EFFICIENCT — Pump and motor are engineered and built together as a smooth-working team, and Allis-Chalmers takes undivided responsibility for performance. Every Electrifugal pump is run and tested at the factory for efficiency, capacity and head.

IMMEDIATE DELIVERY — Many sizes of Electrifugal, PEDRIFUGAL and SS UNIT pumps are now in stock at convenient points. Phone or wire your nearest Allis-Chalmers office or dealer for latest information on stocks and deliveries. For description of the complete line of A-C centrifugal pumps, to 600,000 gpm, ask for Bulletin B6059D. ALLIS-CHALMERS, MILWAUKEE 1, WIS.
A 2382

PEDRIFUGAL
The new A-C pump for flexible Texrope V-belt drive. Capacities to 500 gpm, heads to 100 ft.

SS UNIT
Close-coupled pump and motor units, made in 234 standard ratings, to 2500 gpm.

Electrifugal, Pedrifugal, SS Unit and Texrope are Allis-Chalmers Trademarks.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

IN THIS ISSUE

FEBRUARY 26, 1948

Paper Forces Gather in New York 39
Newspaper Inventory Up by 5-Day Supply .. 39
Paper Production Achieves Another New High 44
Kraft Review and Outlook 48
Newsprint Paper in 1947 50
Woodpulp Faces Triple Problem 56
TAPPI Prepares Bigger Program 66
TAPPI's Forward Strides in 1947 Reflect Industry Progress 71
Resinography 80
Federal Legislation on Water Pollution Control 92
Specification for Chemical Composition of Process Water for Manufacture of Groundwood Papers 105
White Water Treatment—An Industrial Waste Problem 106
Education for the Paper Industry 116
Pulping of Straw with Digestion Liquors Containing Sodium Sulphite 124
Yield and Quality of Pulp and Waste Liquor in Sulphite Pulping of Softwoods 130
Seasonal and Geographical Variations in Tall Oil Composition 137
N.P.T.A. Revises Order of Its Program 142
Inland Container Starts up Macon Plant 143
PRODUCTION RATIO REPORT 140
EDITORIAL 141
FINANCE 145
IMPORTS 149
MARKETS 151
TRENDS 153
PRICES 155

INDEX TO ADVERTISERS ON PAGE 188

Volume 126 — Number 9

PAPER TRADE JOURNAL
REG. U. S. PAT. OFF.

Executive and Editorial Offices: 15 W. 47th St., New York 19, New York
Published Every Thursday by Lockwood Trade Journal Co., Inc.

GEO. E. LOCKWOOD, *President & Treasurer*
ARTHUR E. GORDON, *Vice-President*
JOSEPH P. HORGAN, *Secretary*
W. L. COOK, *Editor*
E. P. McGINN, *Technical Development Editor*
E. P. NUTTALL, *Assistant Editor*
R. G. MACDONALD, *"TAPPI" Editor*
F. B. GROSSE, *Production Manager*

Eastern Representatives
BRUCE E. BROWN
15 W. 47th St., New York 19, N. Y.; Phone PLaza 7-2370
EDWARD H. DOERING
15 W. 47th St., New York 19, N. Y.; Phone PLaza 7-2370

Pacific Coast Representatives
ROY M. McDONALD & CO.
San Francisco, 4, Cal., 564 Market St.; Phone YUkon 6-0503
Los Angeles, 5, Cal., 639 S. Wilton Pl.; Phone Drexel 2590
Seattle, 1, Wash., Terminal Sales Building; Phone Main 3860

Mid-Western Representatives
H. K. VINTON
30 N. Dearborn St., Chicago 2, Ill.; Phone Central 2784
FRANKLYN H. OLSEN
1674 Sunview Rd., South Euclid, Cleveland, 21, Ohio; Phone Hillcrest 1124-W

Southern Representative
EDWARD M. BUCK
P. O. Box 2856, Dallas 1, Texas

Representative for Denmark, Norway, Sweden and Finland
OXFORD TRADING AKTIEBOLAGET
Bibliotekgatan 6-8, Stockholm, Sweden

Subscriptions: (Payable in advance) By the year, $5.00; Single Copy, This issue, One Dollar. *Postage Extra: To Canada, $2.00; To Other Foreign Countries, $3.50.* Member Audit Bureau of Circulation.

PAPER *established Feb. 17, 1899, combined with* PAPER TRADE JOURNAL, *Nov. 16, 1899.* PAPER *established Sept. 21, 1910, combined with* PAPER TRADE JOURNAL, *Feb. 19, 1926.*

All rights to the above titles reserved.

PAPER TRADE JOURNAL *is entered as Second Class matter at the Post Office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 N. Crystal St., East Stroudsburg, Pa. Printed in U. S. A.* *Copyright 1948 by the Lockwood Trade Journal Company, Inc. The contents of* PAPER TRADE JOURNAL, *including all articles, illustrations, etc., are covered by copyright and may not be reprinted except by permission.*

PAPER TRADE JOURNAL *is indexed in Industrial Arts Index.*

CALENDAR OF COMING EVENTS

May 19, 20, 21, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

June 11-12, 1948—Paper & Twine Association, Annual Convention, French Lick Springs, Indiana.

It's like putting

Money in the *Bank*

Save–

FIBER, FUEL
WATER, CHEMICALS

Solve–

STREAM PURIFICATION
PROBLEMS

with

Sveen Pedersen

——FLOTATION——

Saveall

Sveen Pedersen Flotation Saveall saves you more money by recovering more fibers and fillers than the conventional type savealls. Sveen Pedersen clarifies the water to such a high degree of purity that it can be extensively re-used in the system. Fresh water and fuel consumption are greatly reduced and steam improvement problems virtually eliminated.

Other Advantages of Sveen Pedersen

Low maintenance cost • Rapid Circulation through the System • High Efficiency on Heavily Loaded Stock • Insensitivity to Ordinary Fluctuation in White Water Flow • Ease of Cleaning

Write For

this **FREE** *brochure*

BULKLEY, DUNTON PULP CO., INC.
295 MADISON AVENUE, NEW YORK 17, N. Y.

In Canada: **ALEXANDER FLECK, LIMITED**
416 WELLINGTON STREET, OTTAWA, ONTARIO

Paper TRADE JOURNAL

VOL. 126, NO. 9 REG. U.S. PAT. OFF. FEBRUARY 26, 1948

COLA G. PARKER

Cola G. Parker Heads APPA Gillespie Elected by TAPPI

NEW YORK—The many-sided interests of the pulp and paper industry converged this week in New York on the occasion of annual conventions of its major associations. The American Pulp and Paper Association, the many specialized-interest groups which constitute its membership, the Technical Association of the Pulp and Paper Industry, and the Salesman's Association all held their annual meetings. Programs packed with interest and value, luncheons and dinners set new high marks.

Cola G. Parker, for the last four years first vice-president of the American Paper and Pulp Association, was advanced to the presidency of that central organization of the United States at the Association's annual meeting on Thursday. Mr. Parker, President of the Kimberly-Clark Corporation of Neenah, Wisconsin, is also well-known through his official positions in many Wisconsin and National organizations, as well as in a number of corporations in which he is interested. He is a trustee of the National Industrial Conference Board, a director in the National Association of Manufacturers, a director of the Wisconsin Manufacturers Association, a trustee of Lawrence College of Appleton, Wisconsin, and a director in the Port Washington National Bank and Trust Company, the First National Bank of Neenah, Wisconsin and the First National Bank of Appleton, Wisconsin.

Re-election of Wilbur F. Gillespie to the presidency of TAPPI was formally confirmed at yesterday's opening session of that group in the Commodore's Grand Ballroom. Succeeding to the office while vice-president, by vote of the Executive Committee, folowing the death last July of President Worthen E. Brawn, his continuation of office now marks the seventeenth time that a TAPPI president has been returned to a second term of office. The encumbent is Technical Director of Gaylord Container Corp., Bogalusa, La. He was elected executive committeeman in 1944.

Albert E. Bachmann, vice-president and superintendent, Mississquoi Corp., Sheldon Springs, Vt., was elected vice-president. He had served on TAPPI's Executive Committee from 1943 to 1946. The election of four new committeemen was also certified by the tellers, these being: Harold W. Bialkowsky, Pulp Division, Weyerhaeuser Timber Co., Everett, Wash.; Frederick C. Goodwill, Chief Chemist, St. Regis Paper Co., Deferiet, N. Y.; Willis B. Lincoln, Jr., Development Engineer, Inland Container Corp., Indianapolis; and Albert L. Sherwood, Technical Director, Sutherland Paper Co., Kalamazoo. The normal term of office for committeemen is three years.

(Continued on page 139)

Tinker Praises Robertson For Industry's Progress

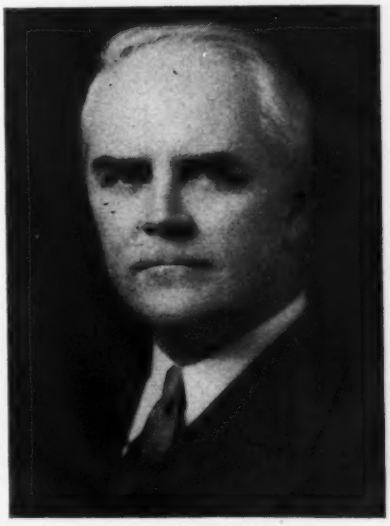
NEW YORK—Upon his retirement this week as president of the APPA Reuben Robertson received not only the private congratulations of those who know how much of his own effort he has put into the affairs of his office, but also public acknowledgment of the value of his services. In a letter addressed to him, but kept apart from minutes of the convention, E. W. Tinker, secretary of the Association recounted the progress that has been made in problems of the industry during the past two years.

Since you are terminating two years of service as President of the American Paper and Pulp Association, it seems appropriate that I summarize for you the position of the industry as viewed by the staff of the Association. No summarization of the existing situation would be complete without consideration of the outlook and trends.

With the tremendous growth that has taken place, the pulp and paper industry must recognize the important place it has attained in our domestic economy. While as a manufacturing enterprise the pulp and paper industry ranks sixth among our domestic industries, its well being has a weight in the national welfare far beyond the immediate employment that is offered and its earnings. This is true because its products invade and are essential to every phase of our modern life.

In order to consider intelligently the industry's outlook and the questions

(Continued on page 136)



REUBEN B. ROBERTSON

Stream Group Names George E. Dyke Head

NEW YORK — At the fifth annual meeting of the Board of Governors of the National Council for Stream Improvement, George E. Dyke, president of Robert Gair Company, Inc., was elected chairman of the Board of Governors. Other officers elected included the following: Chairman, Board of Governors, George E. Dyke; vice-chairmen, Board of Governors, J. D. Zellerbach, Clyde B. Morgan; treasurer, J. D. Zink; executive secretary and assistant treasurer, Russell L. Winget.

George E. Dyke, president of Robert Gair Company, Inc., and chairman of the Board of Governors, presided at the meeting and stated that membership in the Council, which is national in scope, currently represented 85 percent of pulp, paper and paperboard production in the United States. Mr. Dyke said that he had had an opportunity during the past year to follow closely the many activities of the Council, and that he felt confident that notable progress had been made. Judging from the expressions of opinion he had received from members in various regions of the country, it was his belief that the industry was progressively mindful of the importance of the organization and of its activities.

Research institutions currently engaged in research on industry stream improvement problems include: Mellon Institute of Industrial Research, where acid and alkaline bleachery wastes and inter-industry pollution problems are being studied; Purdue University, carrying on with strawboard waste research instituted two years ago; Rutgers University, engaged in white water problems; University of Michigan and Kalamazoo College, assisting in the study of deinking wastes; Institute of Paper Chemistry, studying aquatic biology problems; Manhattan College, where stream analysis work is centered; Virginia Polytechnic Institute, investigating semi-chemical waste problems; Louisiana State University, currently engaged in studying biological processes applicable to kraft mill waste treatment; and Oregon State College, where a dual project dealing with yeast production and aquatic biology problems is under way.

In commenting on the Council's program Mr. Dyke said, "As the scope of the Council's program expands it becomes more and more evident that the organization must be considered a permanent one. Technological developments in the waste treatment field require that the industry be kept abreast of these developments through continuous research and development. It must also be recognized that as the sanitary conditions of the country's streams and rivers improve under public pressure and the desire of the industry to improve existing conditions, so too, the industry's knowledge and development of treatment methods applicable to changing circumstances must be broadened."

Edwards Advances To Head Salesmen

NEW YORK—At the annual meeting of the Salesmen's Association of the Paper Industry on Tuesday, Edward J. Edwards, of Howard Paper Mills, was elected president for 1948, succeeding E. F. Miles, of Crocker-McElwain Co.

Other officers elected for the coming year included Alan Helffrich, St. Regis Paper Co., vice-president for the Eastern division, and George M. Watson, of Mead Sales Co., assistant eastern vice-president, both of whom are thus continued in office for another term. For the Western division, D. H. Keck, of Kimberly-Clark Corp., was chosen vice-president, and T. Donnell Evans, of W. C. Hamilton & Sons (Chicago office) was named assistant vice-president. E. G. Amos was reappointed to the post of secretary-treasurer by the executive board.

Paul Hodgdon Heads Glassine Manufacturers

NEW YORK — Paul Hodgdon, president of the Deerfield Glassine Company, was elected chairman of the Glassine and Greaseproof Manufacturers Association Executive Committee at its meeting this week. He succeeds E. H. Jennings, chairman for the last two years. Folke Becker, president of the Rhinelander Paper Company, was elected to represent the group on the board of governors of the American Paper and Pulp Association. Other members of the executive committee were reelected.

PAUL HODGDON
Heads Glassine Group

Statisticians See Continued Increase

NEW YORK — At the meeting of the Statistical Committee of the American Paper and Pulp Association held Tuesday at the Waldorf-Astoria, it was indicated that the 1948 paper and paperboard production will reach 22 million tons if the balance of this year's production shows the same increase over 1947 that was attained in January. While the paper industry is making some progress in catching up with overall demand, pipe line inventories have not yet returned to normal in a number of important grades.

The Association's Monthly Statistical Summary for January analyzes growth trends in the industry in terms of per capita consumption and the trend of population growth. By projecting the trend line of per capita consumption, consumption is expected to reach 30 million tons by 1955, assuming a high level of business activity. That would mean 400 pounds per capita consumption for a population of 150 million people. Assuming these trends continue, domestic production requirements by 1955 should reach 25 million tons, allowing for imports of 5 million tons. In order to meet this consumption expectancy of 30 million tons, the industry would have to increase its annual productive capacity a million and a half tons above the 23 million tons capacity expected to be in operation by the end of this year.

The many new applications of paper developed during and since the war appear to have accelerated the growth in per capita paper consumption. The swings of per capita consumption coincide with the swings of the business cycle, but the long-term trend has been distinctly upward.

Kimberly Foremen Hear of Pension Benefits

KIMBERLY, Wis. — About 85 persons attended a dinner meeting of the Foremen's club of the local Kimberly-Clark Corporation mill February 16, and heard talks on pension and insurance benefits and on the forestry holdings of K-C.

L. A. Eisenach of the insurance division of the corporation discussed the various types of benefits provided for employes, including those sponsored by the company as well as those required by law. Among those provided by the company, some partly and other entirely paid for by Kimberly-Clark, are the pension plan, the Mutual Benefit Association, group insurance, and the Blue Cross hospital plan.

J. B. Millar of the Woodlands department said that timber rights held by Kimberly-Clark in the United States and Canada total almost 9,000,000 acres.

Writing Paper Group Re-elects M. D. Bardeen

NEW YORK—Maxwell D. Bardeen, president of the Lee Paper Company, was elected to a second term as president of the Writing Paper Manufacturers Association at its meeting this week in the Waldorf-Astoria. Also elected for the second year as vice-presidents were W. B. Zimmerman, The Howard Paper Mills, Inc., and H. V. Burgee, Parsons Paper Co.

M. C. Dobrow was re-elected executive secretary-treasurer. This marks the beginning of Mr. Dobrow's 33rd year with the association. John F. Darrow was elected assistant-secretary and Olive F. McGill was elected assistant treasurer of the association.

Members re-elected to the executive committee representing th Rag Content Group were: H. V. Burgee, Parsons Paper Co.; G. H. Gerpheide, Hawthorne Paper Co.; A. C. Gilbert, Gilbert Paper Co.; Hale Holden, Jr., Byron Weston Co.; R. S. Madden, Valley Paper Co.; D. E. Oberweiser, Fox River Paper Corp., E. C. Reid, American Writing Paper Corp.; A. J. Schierl, Whiting-Plover Paper Co.; G. L. Williamson, Strathmore Paper Co.

Members re-elected to the executive committee representing the Sulphite Bond Group were: W. B. Zimmerman, The Howard Paper Mills, Inc.; W. J. Garrity, Munising Paper Co.; H. H. Hanson, W. C. Hamilton & Sons; W. L. Jennings, West Virginia Pulp & Paper Co.; C. B. Morgan, Eastern Corp.; A. C. Remley, Nekoosa-Edwards Paper Co.; F. H. Savage, International Paper Co.; R. I. Worrell of the Mead Corporation.

The following were also elected to the executive committee: R. M. Swaney, Franklin Paper Co., representative of the Bristol Board Group; D. T. Quirk, Peninsula Paper Co., representative of the Cover and Text Paper Group; Bruce Crane, Crane & Co. Inc., representative of Thin Paper Group.

H. H. Hanson was elected as the association's representative on the American Paper and Pulp Association's Board of Governors. W. B. Zimmerman was elected as alternate representative on the board.

Speakers at the meeting—attended by 150—included Richard M. Bissell, Jr., executive secretary of the committee which prepared the Harriman Report on the Marshall Plan and a member of the faculty at MIT; Pierre J. Landry, European Observer for the U. S. Pulp Producers Association; President Bardeen; executive secretary Dobrow; W. W. Corlett, counsel, spoke on legal matters concerning the association and E. G. Amos, secretary of the American Paper and Pulp Association's Committee on Industrial relations.

D. T. Quirk, vice-president, Peninsular Paper Company, was elected

(Continued on page 42)

GEORGE STUHR
Heads Sulphite Manufacturers

Rondout Mill Wins $145,000 Award

SAUGERTIES, N. Y.—The Rondout Paper Mills, Inc., located at Napanoch, near Ellenville, has been allowed $145,000 on a claim of $1,200,000, a report of the Condemnation Commission dealing with properties in the Town of Wawarsing in connection with one of the New York city water works projects, a report filed, discloses.

Herman E. Gottfried, counsel in charge of the Water Supply Division, announced on behalf of John P. McGrath, corporation counsel of the City of New York, that the Condemnation Commission composed of William A. Kelly of Kingston, Nathan W. Math of New York city, and Philip R. Murray, Jr., of Albany, has rendered its final report. The award is held subject to determination by the Courts.

Laurola Visits Nashua Mill

NASHUA, N. H. — Olavi Laurola, technical adviser of the Finnish Cellulose Association, recently visited the Nashua Gummed & Coated Paper Company. He had come to this country to study the paper mills and converting plants here so as to determine how their products may best serve our needs. He gave an encouraging picture of Finland, telling of its progress towards economic recovery and the substantial amount paid against Russian reparations. Already 46 per cent of the reparations have been paid off.

On exports of paper and pulp, Mr. Laurola stated that Finland planned to confine these mostly to high quality products and that they would not attempt to compete with the cheaper grades produced on this continent.

Sulphite Group Picks George Stuhr as Head

NEW YORK—Following its annual luncheon on Monday of this week at the Waldorf-Astoria the Sulphite Manufacturers Association went into its executive session, heard reports of the past year's activities, and elected George Stuhr, of International Paper Company Southern Kraft Division to be its general chairman. The luncheon itself was a fitting inaugural of the week, with its feature a talk on the future, as an economist sees it, delivered by Col. E. C. Harwood, director of the American Institute for Economic Research.

Other officers include:

Vice-Chairman, (Bleached Group) James G. Conley, Sales Manager Fraser Paper Ltd.; Vice-Chairman, (Unbleached Group) Donald F. McCall, vice-president, Racquette River Paper Co.; Vice-Chairman, (Manila Group) Jack B. Cowie, Sales Manager, Hollingsworth & Whitney Co.; Vice-Chairman, (Machine Glazed Wrapping Group) Neil E. Nash, vice-president, Nekoosa-Edwards Paper Co.; Vice-Chairman, (Bleached Converting Group) Gilford F. Henderson, Sales Manager, Paper Division Brown Company.

The new Board of Governors includes the above officers together with the following: Alfred Southon, Vice-President, Kalamazoo Vegetable Parchment Co.; Wayne A. Brown, Crown Zellerbach Corp.; Leo E. Croy, Executive Vice President, Marathon Corporation; Allan G. Hendry, Consolidated Water Power & Paper Co. Edgar W. Kiefer, (ex-officers) Chairman of Board, Port Huron Sulphite & Paper Co.; Rufus I. Worrell, President, Mead Sales Co., Inc.

Col. Harwood declared that the severe declines in the prices of many commodities during recent weeks have aroused widespread apprehension regarding the future of both prices and business. In attempting to understand the significance of these and other less striking recent economic changes, it is first desirable to understand why apprehension is justified. Prices and business activity are at extremely high levels, from which great declines are obviously possible. Why do these conditions exist?

During the war the Government issued money in the form of currency and checking accounts far more rapidly than goods were produced and sent to market. Fortunately, much of this inflationary purchasing media was not used immediately but was held by individuals and businesses in order to buy new cars, houses, plant, equipment, and other goods after the war. Consequently, the price increases that occurred during the war were limited.

After the war, when large-scale production of goods for consumers and equipment for industry was resumed, corporations and individual consumers

attempted to use the money accumulated during the war. Rapidly rising prices followed as a result of the competitive bidding for relatively scarce goods.

Deflation began in mid-1946. The Government then reversed the process by which the great inflation had been created and began to retire the inflationary money from circulation. This was done by using surplus Treasury funds, in the form of checking accounts, for the retirement of bank-held Government bonds. As the banks gave bonds back to the Treasury, the checking accounts created when the bonds were originally purchased were canceled.

This process has continued with minor interruptions to date. At first, commodity prices continued upward as funds hoarded during the war were used by businesses and individuals. Recently, however, the retirement of inflationary purchasing media has exceeded the funds drawn from hoards. Apparently, that situation will continue for the next several weeks, at least.

Further deflation as the result of Treasury surpluses is virtually assured for the next several weeks. This deflation may be drastic, because only 40 percent of the wartime inflation has thus far been canceled. The effects of further deflation may be greater than the optimists now believe possible. A serious deflation, a crisis in the money markets, and at least a minor business depression are well within the range of probabilities.

The maximum rate of deflation expected will come during March, and the effects should follow soon thereafter. Consequently, extreme caution in making business and financial commitments is desirable, until the extent of the deflation now in progress can be more accurately determined.

Newspaper Inventory Up by 5-Day Supply

NEW YORK — Daily newspapers reporting to the American Newspaper Publishers Association had 41 days supply of newsprint on hand and in transit at the end of January 1948. This represents an increase of five days supply compared with stocks on hand at the end of December 1947. These stocks of 41 days at the end of January 1948 compare with 36 days at the end of January 1947; 39 days at the end of January 1946 and 54 days at the end of January 1945. These stocks on hand and in transit include a considerable amount of tonnage brought in by water in the summer, use of which by some newspapers is spread over a period of several months.

Daily newspapers reporting to the ANPA consumed 292,534 tons of newsprint in January 1948 compared with 266,422 tons in January 1947 and 221,054 tons in January 1946. This was an increase in January 1948 over January 1947 of 9.8 percent and an increase over January 1946 of 32.3 percent.

The total estimated newsprint consumption in the United States for January 1948 was 382,397 tons which includes all kinds of uses of newsprint.

MacAdam Urges Limit On Annual Cutting

BOSTON—W. C. MacAdam, forester for the Great Northern Paper Company, who was elected vice-chairman of the New England Section of the Society of American Foresters at the 28th winter meeting of the organization at the Hotel Statler, February 20, said his concern is cutting no more timber than it produces.

"It takes 60 years to produce a tree," he explained. We cut no more than one-sixtieth of our timber in a year."

Clyde L. Martin, president of the Society of American Foresters and chief forester of the Weyerhauser Lumber Company of Tacoma, Wash., which owns 2,225,000 acres of forest land in the Pacific Northwest, about equal to that owned by the Great Northern Paper Company in Maine, noted the work and the products of a bark mill.

He said "we are developing sulphate mills to run on waste from the sawmills. The newer mills do away with waste liquor by drying it and using it to make gas to run the plants. We still haven't found a way to make a sulphate mill smell nice."

The modern way, he pointed out, is to have enough plants in an area to make every possible use of the wood—a saw mill, pulp mill, plywood and bark plant, but this only can be done by the large companies.

In a discussion or reforestation, Mr. Martin said "the era of reforestation is well under way. Seventy percent of private lands are under forestry management today." His company, he said, found that 1,000 board feet can be taken every year from each acre in thinnings of Douglas fir. Pulp and paper mills then take off a crop every 30 years, leaving 80 to 100 trees an acre to cut as big timber at the end of 70 to 80 years (spruce takes 65 to 80 years to grow).

"If we develop an economy like Sweden's," he said, "we'll cut trees 14 to 17 inches in diameter and 160 feet tall in that time."

Bulkley Dunton Assigns Blachley to Newark

NEWARK, N. J.—Theodore H. Blachley has joined the sales staff of the local office of Bulkley, Dunton & Co., Inc., paper distributors and wholesalers. Prior to this appointment, Mr. Blachley's experience in the paper field includes nine years with Bulkley, Dunton in the company's New York office, where he held the title of sales promotion manager of the Merchandising Division. During the war he served as Captain in the U. S. Army Air Corps and spent four years overseas as an aerial navigator.

Writing Paper Group Re-elects M. D. Bardeen

(Continued from page 41)

chairman of the Cover and Text Paper Group of the Writing Paper Manufacturers Association at its meeting at the Waldorf-Astoria on February 25, 1948. R. H. Morrill, Chemical Paper Manufacturing Company, is the retiring chairman of the Group.

Other members of the Cover and Text Paper Committee elected at the meeting are as follows: M. A. Park, vice-chairman, Marvellum Company; R. F. Arnold, Strathmore Paper Company; J. H. Dunton, W. C. Hamilton & Sons; and H. T. Johnson, Mohawk Paper Mills, Inc.

C. W. Boyce, consultant for the U.S. Bureau of the Census and private organizations, former executive secretary of the American Paper & Pulp Association until 1938, addressed the Group.

Boyce observed that the more modern paper machines were designed to manufacture specific types of paper. Therefore, they do not lend themselves efficiently to grade shifting to the same extent that older machines do.

He pointed out that a development is occurring in the domestic pulp producing industry which may have far-reaching effects. More pulp is being manufactured by such processes as defibrating or exploding the wood. This development, if expanded, could release substantial digester capacity for the manufacture of additional tonnages of pulp.

M. C. Dobrow, executive secretary of the Writing Paper Manufacturers Association, presented his annual report. "Production of fine papers," Mr. Dobrow said, "was 1,210,000 tons in 1947, four percent higher than in 1946, the previous record year. It was not until the turn of this year that some change in the supply-demand situation became evident. There is now an apparent balance between supply and demand for some, but not most, writing papers. It is possible that increased production will overtake demand for most types of writing papers some time in the latter part of 1948."

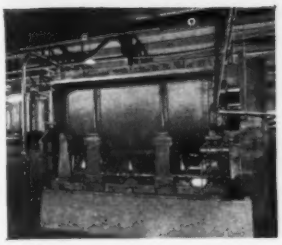
Newsprint Makers Re-elect Hobson

NEW YORK—John L. Hobson, president, St. Croix Paper Co., Boston, Mass., was re-elected president of the Newsprint Manufacturers' Association at the annual meeting at the Waldorf Tuesday forenoon. Other officers, who served during 1947 and were re-elected at the meeting are: J. D. Zellerbach, president Crown Zellerbach Co., New York, vice-president, and John Zima, assistant secretary and treasurer.

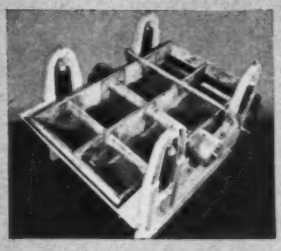
The association's board of governors is composed of the president and vice-president and R. W. Wortham, Jr., vice-president of Southland Paper Co., Inc., Lufkin, Tex.

THIS CONVENTION of BIRD MACHINERY

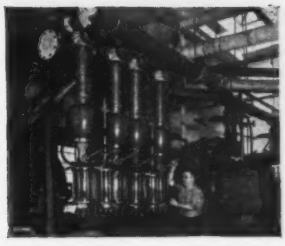
is assembled for the purpose of helping you to make better pulp and paper and more of it per day at lower cost per ton



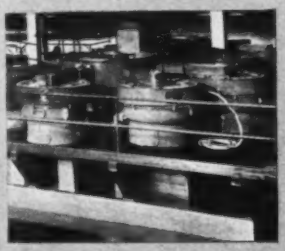
BIRD SCREENS are the standard of the world — handle 80% of all the paper stock in North America. They are essential for continuous, maximum production of uniformly good paper.



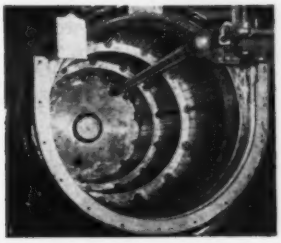
JONSSON SCREENS are ideal for knotting all kinds of pulp with negligible loss of good fibres in the tailings; outstanding, also, for screening defibered wood, straw stocks, waste paper and de-inked stocks.



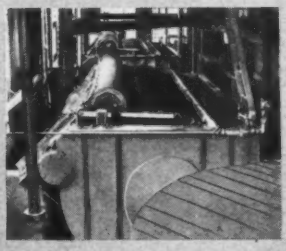
DIRTECS are being widely adopted and endorsed by all kinds of mills as most effective and economical removers of heavy and fine dirt both ahead of the Bird Screens and as tailings units.



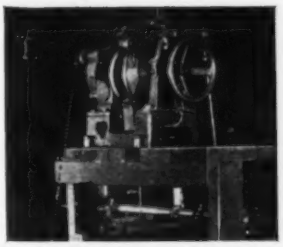
BIRD CENTRIFINERS provide triple centrifugal treatment for separating specks of dirt, metal, rubber, etc. from high grade writings, condenser papers and other specialties.



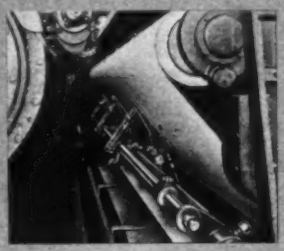
BIRD OSCILLATING SHOWER PIPES keep screens and cylinder molds clean with a fraction of the shower water formerly used. Savings in water, fibre and heat quickly pay for them.



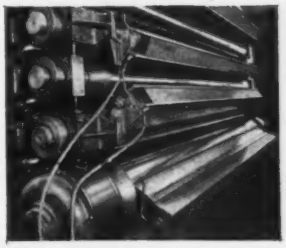
BIRD SAVE-ALLS are the standard means of recovering good papermaking fibres from paper machine waste water. They assure lowest net cost per pound of fibre recovered.



BIRD CONSISTENCY REGULATORS are proving the most dependable and trouble-free means of controlling pulp and paper stock consistency at every desired point. Consistency is held to not more than 0.1% heavier or lighter than desired.



VICKERY FELT CONDITIONERS keep press felts continuously clean and absorbent without midweek shutdowns, improve quality and uniformity and assure maximum water removal at the presses.



VICKERY DOCTORS are engineered for each individual press roll, wire roll, dryer, calender and super-calender roll. Roll surfaces are always clean and shining, in shape to do their best work continuously.

For Bulletins, recommendations, layouts and estimates on any or all items of Bird Machinery, get in touch with

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Paper Production Achieves Another New High

Over-All Production in 1947 of 21,000,000 Tons Shows Gain of 9% Over 1946 — Prospect for 1948 Indicates Output Approximating 22,000,000 Tons

By M. C. Dobrow, Executive Secretary, Writing Paper Manufacturers Association

The U. S. paper industry made another new production record in 1947, exceeding the previous high mark of 1946. The 1947 production of paper and paperboard in the U. S. was 21,029,000 tons. This was a gain of 9% over 1946 production; a gain of 75% over the average output of 1935-39, which was 12,036,421 tons.

Throughout the year, nearly every ton of paper was eagerly sought, at home and abroad. It was not until the turn of the year that some change in the supply-demand situation became evident.

There are signs that increased production is beginning to overtake demand. The backlog of orders is still sufficiently high to indicate full operations during the first half of 1948, but there is a growing opinion that by summer a closer balance between supply and demand will be achieved in the paper industry generally. Such items as newsprint and wrapping paper are expected to continue in under-supply for a longer time.

In the paper industry, as in all industries, expansion of capacity was planned well before V-J Day. Everyone remembers that period when post-war planning was the vogue and when business used the symbols V-1, V-2 and V-3. V stood for Victory and the numbers indicated the first three years after victory. In that scheme of symbols, 1948 is V-3. Thus, this is the year when major post-war expansion plans are expected to be reaching maturity in the paper industry. By late 1948, most installations should be approximately completed.

During the war some forecasters indicated boom demand for most commodities for the years V-1 and V-2, because of wartime destruction and shortages. Then in the year V-3, when the boom was to be at its height (the forecasters continued), completion of new productive facilities finally would have increased production enough to overtake demand. Inventory rebuilding also was to have been completed in the third year following victory.

The capacity of the U. S. paper industry was about 21,775,000 tons at the end of 1947 and is expected to approximate 23,541,000 tons at the end of 1948. In 1939, it was 16,557,000 tons.

These productive capacities are in excess of previous calculations of domestic paper requirements. But if paper production facilities will have outstripped consumption needs by the end of 1948 this condition of supply in excess of requirements probably will not last for more than two to three years.

The requirements for paper, thus far, have exceeded expectations because the boom, or perhaps the growth of business, has been greater than expected. Boom conditions stimulate the per capita use of paper. Furthermore, there has been a larger-than-expected increase in population.

Our present population exceeds 145,000,000, compared with 129,300,000 in 1937. This increase in the last decade is about 80% greater than that from 1930 to 1940. It is approximately the same rate of growth as in the first three decades of this century when immigration and other factors created a heavy increase in our population.

Estimates made a few years ago were that our *present* population would not be reached until between 1950 and 1956. In the face of this accelerated growth of our population, the large expansion of papermaking capacity since 1939 does not appear to be excessive.

Following is a summary of papermaking capacity by grades at the end of 1939 and 1945 and of expected capacity at the end of 1948. The percentage changes indicated are related to the pre-war and post-war periods.

CAPACITIES—ANNUAL BASIS

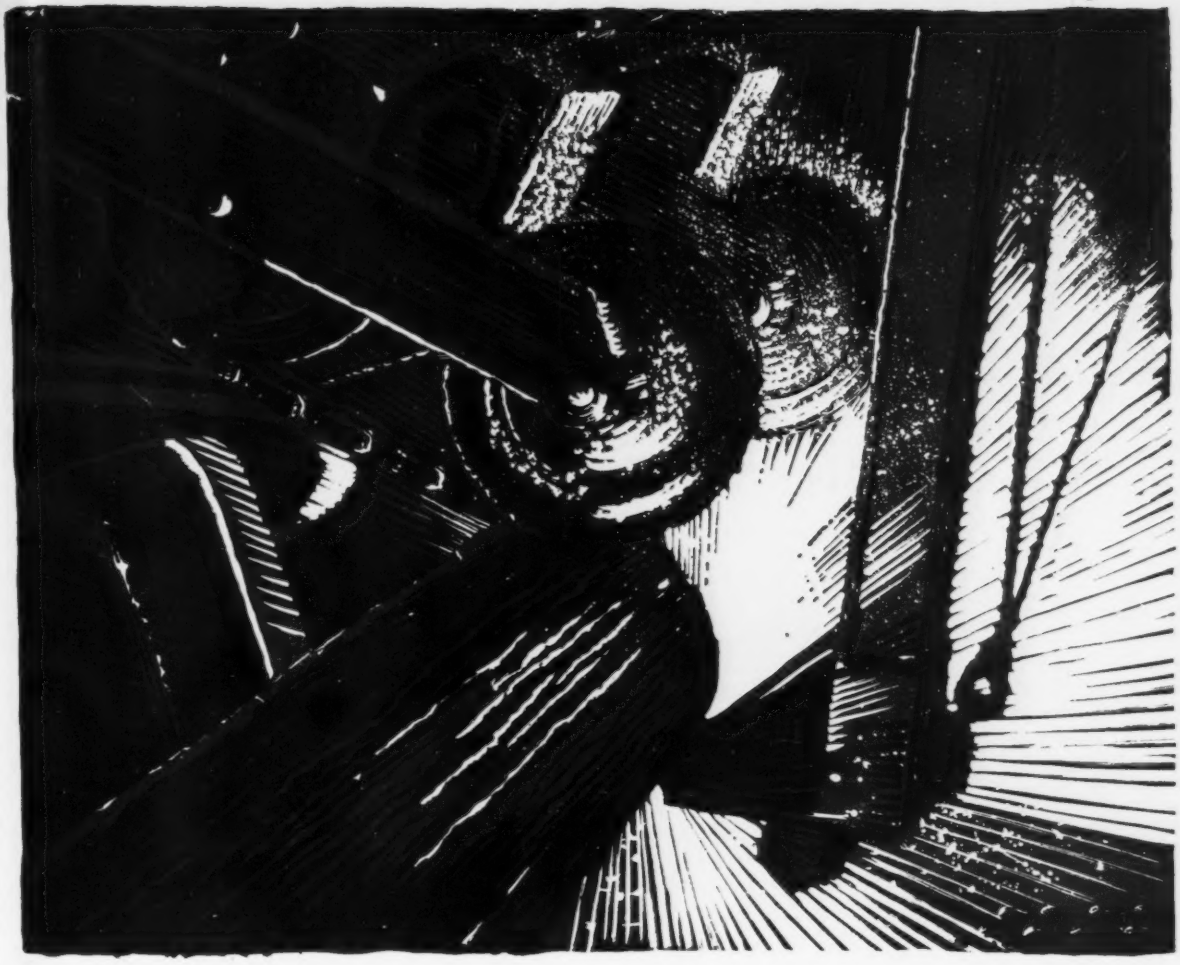
Grade	1939	1945	Expected 1948	% Change 1948 / 1939	% Change 1948 / 1945
Writing Paper	747,100	909,000	991,000	+ 33	+ 9
Other Fine Papers	165,570	260,000	300,000	+ 81	+ 15
Book Paper	1,921,260	1,948,000	2,418,000	+ 26	+ 24
Groundwood	631,470	773,000	846,000	+ 34	+ 9
Newsprint	988,280	876,000	845,000	— 14	— 4
Tissue	772,480	1,115,000	1,319,000	+ 71	+ 18
Wrapping	2,609,580	3,233,000	3,764,000	+ 44	+ 16
Building	938,370	1,160,000	1,260,000	+ 34	+ 9
All Other	252,340	108,000	111,000	— 56	+ 3
Total Paper	9,026,450	10,382,000	11,854,000	+ 31	+ 14
Paperboard & Buliding Board	7,530,960	9,900,000	11,687,000	+ 55	+ 18
Total Paper & Board	16,557,410	20,282,000	23,541,000	+ 42	+ 16

In 1947 the industry produced 21,029,000 tons of paper and paperboard. For the industry as a whole, this was a gain of 9% over the 1946 previous production record of 19,278,000 tons.

The data for the various segments of the industry should be examined carefully because all branches did not experience the same relative gain. Government regulations to meet wartime needs changed the pattern of production of the industry. Since the end of controls, there has been a trend in many grades to return to something like their pre-war pattern.

The following changes in 1947 production, compared with 1939 and 1945, indicate to some extent the character of these post-war shifts.

	1947 Production as Related to 1939	1945
Fine	+ 67	+ 21
Book Paper	+ 43	+ 46
Groundwood	+ 54	+ 30
Newsprint	— 14	+ 12
Tissue	+ 65	+ 9
Wrapping	+ 43	+ 21
Building	+ 83	+ 37
All Others	— 45	+ 15
TOTAL PAPER	+ 42	+ 26
Paperboard & Building Board	+ 73	+ 17
TOTAL PAPER & BOARD	+ 56	+ 21



Barking up the right tree... hydraulically

Whoosh! Bark and water fly as another West Coast Hemlock is barked clean as a whistle by a sweeping jet of water blasting away at a pressure of 1,475 pounds per square inch.

Then, into the mouth of a gigantic chipper, crashes the barked log, which may run to forty inches in diameter, twenty feet in length, to be reduced to evenly-sized chips in less than half a minute.

Developed first by the Pulp Division, Weyerhaeuser Timber Company, hydraulic barking of West Coast pulpwood, coupled with whole-log chipping, has eliminated a former source of waste and has resulted in an increased yield of as much as 20%. Now, only four logs are required to make as much pulp as five logs formerly produced.

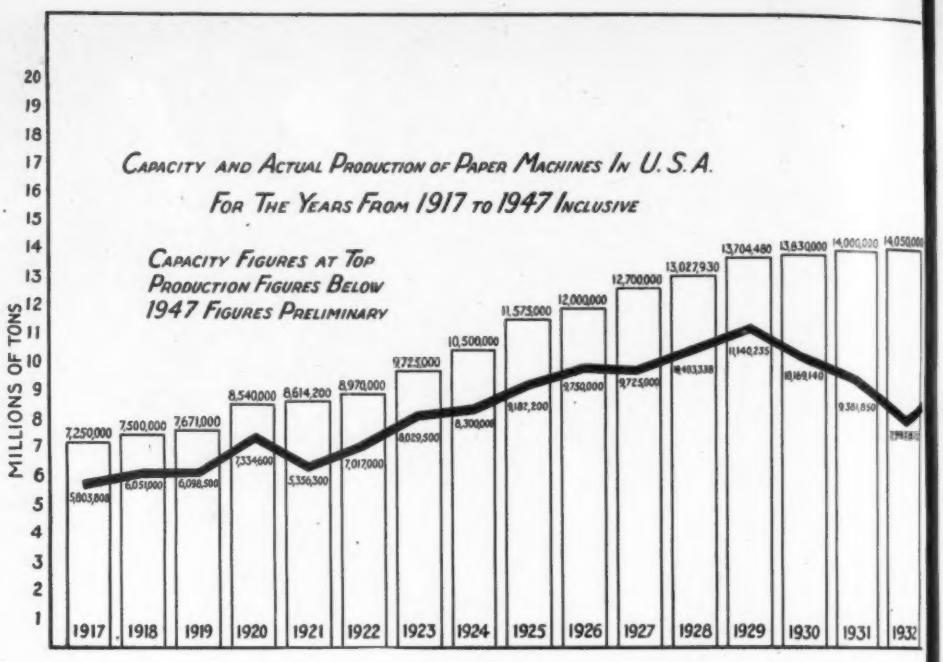
These and other developments, such as slab barking, represent further important steps toward the goal of complete wood harvest. Continuing research and engineering efforts are directed toward further progress in the Weyerhaeuser program of whole-crop utilization.

PULP DIVISION WEYERHAEUSER

During the war there was greater emphasis on packaging. Therefore, paperboard production was given the benefit of priority allocation by the WPB. Since the end of regulations, paper production again has become greater than paperboard output.

Fine paper production at 1,210,000 tons in 1947 established a new high record and exceeded by 4% the previous peak record of 1946, which was 1,160,000 tons.

After the severe wartime regulations on the use of paper for periodicals and newspapers were lifted, book paper production increased to 2,190,000 tons in 1947, a gain of 46% over the 1945 production. Book paper production at 2,190,000 tons in 1947 exceeded the previous peak year of 1941 when the output was 2,026,000 tons.



Newsprint supply in the U. S. during 1947 was about 4,700,000 tons, a 39% gain over the 1945 supply of 3,375,000 tons.

Pulp Prospects for 1948

The increased number of workers in the woods in 1947 made it possible to increase pulpwood cutting, resulting in a considerable increase in domestic pulp production. Total pulpwood receipts in 1947 were 9% higher than in 1946; receipts of domestic wood increased 9%, while imports increased 7%. Consumption of pulpwood in 1947 was 11% above that of 1946. Inventories at the end of 1947 were 21% above inventories at the end of 1946.

Despite this glowing picture in 1947, it should not be overlooked that the long-term outlook for pulpwood is not "rosy" or clear for all sections of the country, particularly in the Northeast and Lake States areas.

U. S. pulp producers in 1947 manufactured 11,952,000 tons of wood pulp compared with 10,607,000 tons in 1946. In 1947, imports from Canada, Newfoundland and Mexico were 1,538,000 tons compared with 1,245,000 tons a year earlier. Imports from Europe amounted to 749,000 tons, against 560,000 tons in 1946.

The supply (domestic production plus imports, minus exports) of wood pulp in the U. S. in 1947 was 14,154,000 tons against a total supply of 12,373,000 tons a year earlier. This huge gain was almost entirely in integrated mills; converting mills operating most of the year with low inventories and inadequate supplies to meet all requirements. This was particularly true for bleached pulps.

The new supply of *market* bleached chemical pulps for 1947 fell short of meeting demand by about 200,000 tons, but the continued excessive use of substitute grades of pulp and supplementary fibres enabled converting mills to attain the high rate of 1947 production.

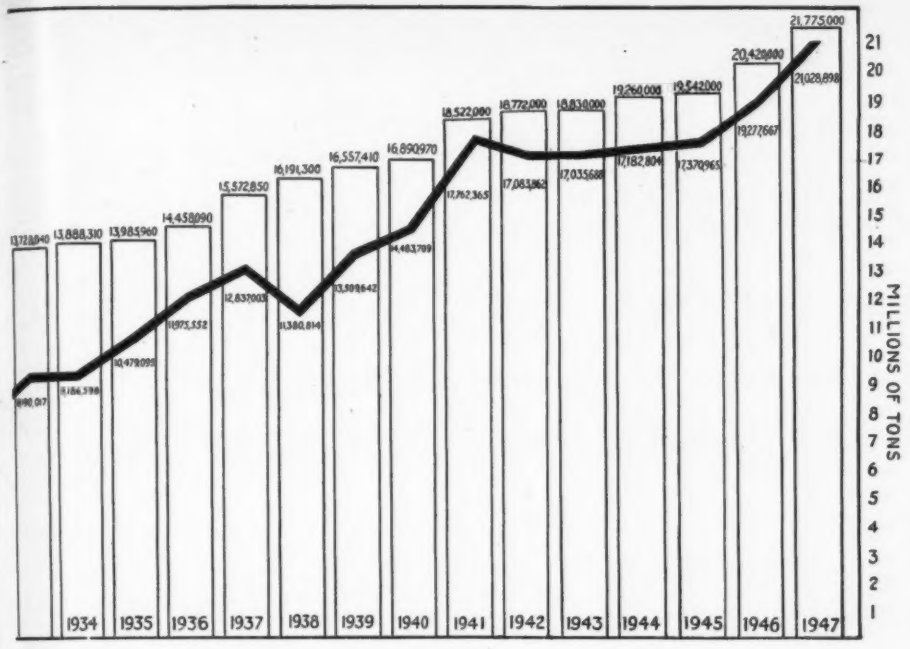
As a consequence, spot sales, particularly for imports from Europe, commanded premiums of as much as $50-$75 per ton over the North American contract prices for bleached sulphite.

The ratio of pulp supply to demand was better in 1947 than in 1946, but the improvement was not sufficient to alter the shortage aspect of the market.

The scarcity of wood pulp in relation to market requirements and the international character of the market for this commodity caused inflationary tendencies in pulp prices to develop which thoughtful people in the industry keenly regret. In 1926, bleached sulphite sold in the U. S. market at about $75 to $80 per ton; in 1939 at about $50 per ton. Early in 1948, North American contract prices for bleached pulp had advanced to about $126-$135 per ton. The advance over 1939 approximates the average increase of agricultural and

UNITED STATES CAPACITY AND PRODUCTION BY GRADES

Grade	1941 Capacity	1941 Actual Production	1941 %	1945 Capacity	1945 Actual Production	1945 %	1946 Capacity	1946 Actual Production	1946 %	Preliminary 1947 Capacity	Preliminary 1947 Actual Production	Preliminary 1947 %
Writing Paper	750,000	738,434	98	909,000	813,885	90	910,000	908,849	99	964,000	923,500	96
Other Fine Papers	224,800	211,580	94	260,000	186,909	72	260,000	255,562	98	300,000	286,466	95
Book Paper	2,045,000	2,025,891	99	1,948,000	1,501,015	77	2,020,000	1,933,428	96	2,197,000	2,189,890	100
Groundwood Printing and Specialty Papers	660,000	642,676	97	773,000	636,026	82	810,000	775,779	96	838,000	829,952	99
Newsprint Paper	1,080,000	1,043,999	97	876,000	725,475	83	850,000	772,797	91	832,000	816,151	98
Tissue Paper	920,000	912,874	99	1,115,000	980,788	88	1,150,000	1,044,495	91	1,241,000	1,072,722	86
Wrapping Paper	2,955,000	2,778,441	94	3,233,000	2,641,229	82	3,250,000	2,962,133	91	3,444,000	3,206,514	93
Building Paper	1,175,000	917,912	78	1,160,000	883,259	76	1,160,000	1,035,639	89	1,260,000	1,206,921	96
All Other Papers	142,200	90,598	84	108,000	88,643	82	110,000	102,811	93	111,000	102,365	92
Total Papers	9,952,000	9,362,405	94	10,382,000	8,457,229	81	10,520,000	9,787,493	93	11,187,000	10,634,481	95
Paperboard & Building Board	8,570,000	8,399,960	98	9,900,000	8,913,736	90	9,900,000	9,490,174	96	10,588,000	10,394,417	98
Total Paper & Paperboard	18,522,000	17,762,365	96	20,282,000	17,370,965	86	20,420,000	19,277,667	94	21,775,000	21,028,898	97



production, consumer income and spending, agriculture, imports, exports, price trends.

What of our new responsibilities in world affairs?

How will the Marrshall Plan affect us — economically, politically and socially?

Are we in for another "boom and bust" period?

In the answers to these vital questions lie the key to paper consumption in the years ahead.

This is the third year of the post-war era in which American industry has been expanding plant capacity — buying new tools and machinery at an unprecedented rate.

The virtual completion in 1948 of the first post-war development and expansion, which had been planned in the rebirth of industrial courage during the war, raises two important questions for the nearby future.

First—When all this new capacity comes into actual production, will the public be willing and able to buy all that can be produced?

Second—Possessing this great addition to capacity, will industry launch a new expansion program before it can be proved that the old and new capacity which is installed can be operated on a satisfactory basis?

Perhaps, in the obviously negative answer to the second question, together with the hope that ample crops will be harvested in this country and in Western Europe, are the indications that the inflationary boom will come to an end during the latter part of 1948.

manufactured products. Wood pulp, of course, is basically an agricultural product that has been processed by chemical manufacturing. Because of the inadequate supply of market pulp to meet all the requirements of converting mills and the increased requirements for several new paper machines which were installed without increasing new pulp making facilities, the pressure of demand upon the supply of pulp was severe throughout 1947. In the early part of 1948, prices for bleached sulphite from Europe and, in some cases, spot prices for North American pulp ranged from $185 to over $200 per ton.

Inventories of pulp in the U. S. at the end of 1947 were larger than a year ago—but still inadequate for a comfortable working supply, especially during the winter months when arrivals from Scandinavian ports are greatly diminished.

In the latter half of 1948 when arrivals from overseas are resumed in quantity and when new capacity will increase American production still more, it is hoped that a better balance will have been achieved between supply and demand for market pulp.

One calculation recently made indicates the need (in the years immediately ahead) of 1,000 tons per day of additional bleached chemical pulps for *market* paper pulp and dissolving pulp. This tonnage is not likely to come from important increases in European imports. Some of the tonnage may come from integrated mills which have increased their productive facilities beyond their needs. However, it is more likely that such increases will come only from the building of new pulp producing units in the United States, Canada and Alaska.

Summary and Prospects for 1948

Actual war ended in victory more than two years ago. We won the war but the question remains, "shall we win the peace?" In the broader economic and political sense, 1948 is the year of decision for the world, for us. In the United States, it is also the year of a Presidential election. Businessmen must look beneath the political confusion and partisan politics to see what is happening to purely economic trends in such fields as: industrial

TOTAL WOOD PULP—ALL GRADES

Supply-Demand

1945

Supply		U. S. Consumption and Exports	
Imports—Canadian	1,079,000	Exports	136,000
Imports—European	675,000	In Manufacture of Non-Paper Products	540,000
U. S. Production	10,167,000	In Manufacture of Paper and Paperboard	10,825,000
			11,501,000
		Inventory Replacement	420,000
	11,921,000		11,921,000

1946

Supply		U. S. Consumption and Exports	
Imports—Canadian	1,245,000	Exports	39,000
Imports—European	560,000	In Manufacture of Non-Paper Products	473,000
U. S. Production	10,607,000	In Manufacture of Paper and Paperboard	12,092,000
	12,412,000		
Withdrawal from Inventory	192,000		
	12,604,000		12,604,000

1947 *(Preliminary)*

Supply		U. S. Consumption and Exports	
Imports—Canadian	1,538,000	Exports	130,000
Imports—European	794,000	In Manufacture of Non-Paper Products	546,000
U. S. Production	11,952,000	In Manufacture of Paper and Paperboard	13,326,000
			14,002,000
		Inventory Replacement	282,000
	14,284,000		14,284,000

In 1948, the paper industry will need to concentrate on two main challenges.

1). The trend towards a buyer's market.

2). Further increases in costs until the inflationary spiral is broken.

A buyer's market is not abnormal for the paper industry. It was the usual condition of business in nearly all the years preceding World War I and World War II. It is not a case of "hard" times coming—but perhaps it should be characterized as one in which "**soft" times are** going out.

In those segments of the paper industry where supply overtakes demand, many marginal producers will be faced with a temporary, but difficult profit squeeze until costs can be pruned downward. Management must concentrate on greater efficiency and economy.

In 1948, the paper and paperboard industry may even establish a new high record by satisfying a demand for about 22,000,000 tons. But the industry with its increased capacity, will be striving to produce and sell more than 23,000,000 tons.

Kraft—Review and Outlook

By Dernell Every, Secretary Kraft Paper Association, Inc.

Manufacturers of kraft paper during 1947 established a new record in the production and shipments of unbleached kraft paper. Annual production of this paper exceeded two million tons for the first time in the industry's history, and bettered the production for 1946, the former record year, by 13 percent.

Although each individual mill may look back upon 1947 as having contained some difficulties, the industry as a whole operated full throughout the year. The industry was not plagued by raw material shortages such as existed in 1946. It is true that market pulp was hard to obtain without bidding for it in a tight "spot" market, but only about 10 percent of the industry now depends upon purchased pulp. Even so, no paper made from market pulp was unsold because of resulting higher prices. Faced with only minor obstacles and enjoying apparently unsatiable demand for its products, the industry ran as fully as machines can operate; between 95 and 100 percent of computed capacity.

Unbleached kraft paper is generally classified into one of three "use" categories. The oldest and most generally understood classification is that of wrapping paper. Demand for wrapping paper in 1947 increased in line with high industrial activity, but only about the same amount was produced as had been manufactured in 1946. This unfortunately resulted in a very tight supply situation which has continued to the present.

Herein lies the industry's most pressing problem. Before the war, more than 400,000 tons of kraft wrapping paper were produced annually. Only about 300,000 tons were produced in each of the last two years. Today's actual demand is probably close to 450,000 tons per year. This trend away from the production of wrapping paper has been felt by every coarse paper merchant in the country. It has been caused by mills traditionally in the wrapping paper business changing over to the production of converting papers. The latter papers, now in sufficient demand to allow long machine runs and deliverable in large rolls, permit a high degree of operating efficiency for the large, fast-running paper machines. On the other hand, wrapping paper must be made to satisfy the requirements of a multitude of consumers for mixed-lot orders of small diameter rolls and various sized sheets, both in a large variety of weights. As a result, most large mills prefer to produce the converting papers. One solution of this problem may lie with the smaller mills who may come to recognize wrapping paper as a desirable product well within their field of specialization.

The largest group of kraft papers is that used for the production of all kinds of bags and shipping sacks. This use of paper which must actually be spread among several distinct converting industries consumes more than half of all the kraft paper produced. I am not apprehensive about the maintenance or, what is more, the continued growth of this large demand for bag and sack papers in 1948.

The remaining classification is one made up largely of miscellaneous converting grades. It contains all of those grades of paper that are not used for wrapping purposes or made into bags or sacks. The tonnage used by manufacturers of kraft envelopes, sealing tape, waterproof papers, window shades, twine, rugs, and all products made of kraft paper other than bags and sacks is in this classification. These papers are specification papers, each having characteristics peculiar to itself and requiring careful manufacture by the paper maker. Any new use papers would also fall into this classification. The outlook for all of these grades looks favorable for 1948.

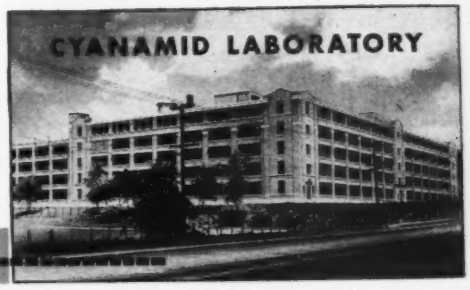
The industry is completing the first stage of a mild postwar expansion. This expansion has been the result of long planning and had to await the availability of machines and construction materials. Three new machines were completed and added to the industry in 1947. These new capacities have been absorbed without yet satisfying all of the industry's demands. Furthermore, these capacities were financed without any appreciable financial strain on the industry. As a result, the industry faces the future in good financial condition, with good equipment, and with ready acceptance of its products.

It is always difficult to look into the future. To do so at present seems more difficult than usual. There are more contradictory opinions today concerning the future than in any period in recent years. Government officials, economists and editorial writers contradict themselves and each other repeatedly on the probable trends of business and commodity prices during 1948. However, it is not so difficult to forecast the outlook for the kraft paper industry as to forecast the prospects for American industry as a whole.

With the addition of six new machines promised during 1948, the industry's annual capacity should expand to approximately two and a quarter million tons for the full year. With demand continuing to exceed production, I foresee another record year for 1948. The first few weeks of 1948 already show the industry off to a good start toward such a record. Even though operating full, the industry still is unable to reduce its unfilled orders or increase its inventories. There is no sign of a drastic curtailment in demand for any of the industry's products. Even if there were, other products would undoubtedly take up the slack. It is, therefore, my belief that the kraft paper manufacturers will produce approximately 2,100,000 tons of unbleached kraft paper during the present year.

Paper Product Pointers
FROM CYANAMID

PRODUCT SERVICE PLUS TECHNICAL SERVICE
Results in Better Mill Production and Wider Markets



The extensive range of Cyanamid paper chemicals constitutes in itself a *product service* to the paper manufacturer—a single dependable source on which he can rely for his paper chemical needs. And the expert assistance of Cyanamid's Technical Staff, backed by the years of experience which make Cyanamid a leader in the development of efficient paper chemicals—all these combine in a high degree of *technical service* available to Cyanamid customers. This combination of product service and technical service can prove of great value to the enterprising paper manufacturer who is seeking to improve his products or to adapt present production to the needs of new markets.

Cyanamid has long been recognized as a dependable source of supply for quality chemicals and paper specialties, and as a pioneer in the development of better paper products—notably the remarkable wet-strength papers now possible with PAREZ* Resin 607. Continuing research is conducted in Cyanamid laboratories to give the paper-maker the utmost in service—both product and technical—and to explore fully the tremendous possibilities that lie ahead for the paper industry.

See you at the Tappi Meeting!

ALWAX** Sizes • WAXINE* Sizes • Rosin Size • PAREZ* Resins
Synthetic Resins • Casein • Alum • Sulfonated Oils • Fillers
Defoamers • Soda Ash • Caustic Soda • Salt Cake • Acids • Clays
AEROSOL* Wetting Agents • CAL MICRO** (Calcium Carbonate) and other Paper Chemicals.

*Reg. U. S. Pat. Off. **Trade-mark

*Trade-mark of American Cyanamid Company covering its synthetic resins for use by the paper industry. The processes under which PAREZ is applied in the production of wet-strength paper are covered by U. S. Patents Nos. 2,291,079, 2,291,080 and 2,345,543 and U. S. Patent Application Serial No. 453,032.

American
Cyanamid Company
Industrial Chemicals Division
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Newsprint Paper in 1947

By J. J. Zima, Statistician News Print Service Bureau

A notable fact about the year 1947 is that the volume of business activity in the United States ran counter to the almost universal forecasts of a business recession which were prevalent at the beginning of that year. Instead of the predicted decreases, practically all industries established new peace-time or all-time high records.

On the basis of data at present available, the output of the paper and paper-board industry in North America north of the Rio Grande—production south of that river is of no very great consequence—rounded up to a little more than 27,000,000 tons of paper and board in 1947. This was the largest tonnage on record and was greater, by more than 2,000,000 tons or nearly 9 percent, than in 1946. Production in the United States amounted to 77½ percent of the total, Canada contributed 21 percent while Newfoundland's output represented nearly 1½ percent.

The continental newsprint paper industry for the second successive year surpassed all previous production records. The rate of increase over 1946, while fairly substantial, was somewhat below that for all manufacturers of paper and board. However, this greater production was still apparently insufficient to satisfy the overall demand.

The newsprint paper situation is discussed at greater length on the following pages and the accompanying tables and charts should be of interest to anyone studying the long-time trends.

Supply

Production

Doing their utmost to keep pace with the unprecedentedly high demand for their product, the North American mills engaged in the manufacture of newsprint paper turned out 5,646,000 tons in 1947. This was an increase of 369,000 tons or 7 percent over the record production in 1946 and also was 702,000 tons or 14 percent above that in the pre-war peak year of 1937. In the past two years there has been a combined increase in production amounting to 1,330,000 tons.

Production in every month of the year was greater than in any corresponding month on record. Output in the month of May was above that of any preceding month and was in turn exceeded in October when, for the first time in history, the monthly total was more than 500,000 tons.

Of the continental total, Canadian mills turned out 4,447,000 tons or not quite 79 percent; the United States segment of the industry produced 826,000 tons or approximately 14½ percent, while the remaining 6½ percent was represented by Newfoundland's production which amounted to 373,000 tons. While there was very little change from the 1946 percent of total figures, they compared with 74 percent for Canada, 19 percent for the United States and 7 percent for Newfoundland in 1937.

Canadian production in 1947 exceeded that of the preceding year by 304,000 tons, or slightly more than 7 percent; the increase in the United States was 55,000 tons or 7 percent, while the gain in Newfoundland's output, which was curtailed somewhat due to pulpwood shortage at one of the mills earlier in the year, amounted to 10,000 tons or 3 percent. Production of newsprint in Canada and Newfoundland attained record proportions last year while that in the United States was greater than in any year since 1942, but was less than half the tonnage produced in 1926, the year of largest output in this country.

Shipments of newsprint paper from all mills totaled 5,706,000 tons in 1947 and were 447,000 tons or 8½ percent greater than in 1946. They were also larger than production by 60,000 tons and resulted in a corresponding decrease in stocks held by all manufacturers. Canadian mills shipped 354,000 tons more than in the preceding year, while movement of paper from producing points in the United States and Newfoundland exceeded that of 1946 by 70,000 tons and 23,000 tons respectively.

Total manufacturers' stocks on December 31, 1947, amounted to 102,000 tons and were 37 percent below those of a year earlier. In the course of the year the Canadian mills reduced their stocks by 43,000 tons or almost one-half, while the decrease in those held by United States and Newfoundland producers was 7,000 tons or 45½ percent for the former and 10,000 tons or 17 percent for the latter. These stocks were equivalent to less than one week's production at the rate attained last year.

Exports

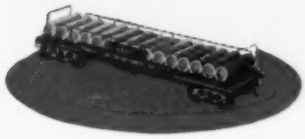
According to official reports issued by the Bureau of Statistics, exports of newsprint paper from Canada in 1947 amounted to 4,220,000 tons with a value of $342,300,000 and both in tonnage and value thereof were the largest ever recorded. This was an increase of 363,000 tons or about 9½ percent in volume and $76,400,000 or 29 percent in value over 1946. Newsprint exports accounted for more than 12 percent of the total value of Canada's export trade last year.

The record for the past two decades as compiled from official reports is as follows:

Newsprint Exports From Canada
(Short Tons)

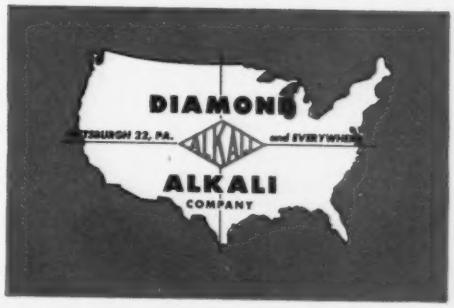
	U.S.A.	Overseas	Total	Percent of Production
1947	3,675,000	545,000	4,220,000	95
1946	3,323,000	535,000	3,858,000	93
1945	2,534,000	525,000	3,059,000	94
1944	2,409,000	397,000	2,806,000	94
1943	2,545,000	265,000	2,810,000	94
1942	2,792,000	213,000	3,005,000	95
1941	2,762,000	500,000	3,262,000	95
1940	2,586,000	657,000	3,243,000	95
1939	2,207,000	452,000	2,659,000	93
1938	1,938,000	487,000	2,425,000	92
1937	2,899,000	556,000	3,455,000	95
1936	2,399,000	594,000	2,993,000	93
1935	2,052,000	523,000	2,575,000	94
1934	1,960,000	454,000	2,414,000	93
1933	1,520,000	318,000	1,838,000	91
1932	1,520,000	257,000	1,777,000	93
1931	1,753,000	255,000	2,008,000	90
1930	2,008,000	325,000	2,333,000	93
1929	2,173,000	342,000	2,515,000	92
1928	1,935,000	272,000	2,207,000	93

Of the total tonnage exported, 3,675,000 tons or 87 percent was shipped to the United States, while 545,000 tons or 13 percent was destined for overseas markets. The quantity exported to this country was the largest on record and surpassed that of the preceding year by 352,000 tons, while shipments elsewhere were only 10,000



multi-unit cars,
or in cylinders,
to best suit
your requirements

CHLORINE
REGISTERED U. S. PAT. OFF.



tons greater than in 1946 and were not equal to those in a number of earlier years. With the exception of the war years 1942-43 when, of necessity, overseas exports were drastically curtailed, the United States received a greater proportion of Canadian export shipments in 1947 than in any one of the preceding 16 years.

In the order named, Australia, the United Kingdom and Argentina were the largest overseas importers of Canadian newsprint in 1947 and between them took 49 percent of the total. Shipments with Australia as their destination totaled 162,000 tons, those to the United Kingdom were 56,000 tons and to Argentina 50,000 tons. The corresponding figures for 1946 were 135,000 tons, 83,000 tons and 46,000 tons.

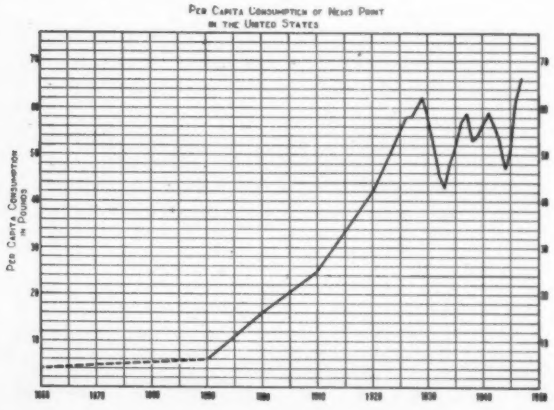
In 1947 the Newfoundland mills shipped 212,000 tons to the United States and 169,000 tons to overseas, making a total of 381,000 tons which exceeded the 1946 record by 22,000 tons or 6 percent. Exports to the United States represented almost 56 percent of the total and were 4,000 tons greater than in the preceding year. They also were larger than in any other year except 1941 and were but 5,000 tons below that year. While there was an increase of 18,000 tons over 1946 in exports to overseas destinations, the total was 13 percent below that of 1945 and 20 percent below the 1937-1940 average.

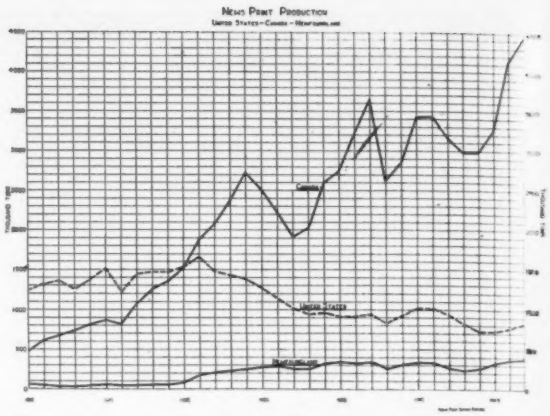
Direct shipments made by United States newsprint manufacturers beyond the borders of this country are reported to have totaled slightly more than 8,000 tons in 1947 and were of the same order as in 1946, but were substantially below those in any year since 1939. These shipments amounted to but 1 percent of production.

The North American newsprint industry as a whole shipped 722,000 tons of paper last year to markets elsewhere in the world or 28,000 tons more than the 694,000 tons exported in 1946. The 1947 total would have been larger had it not been for governmental restrictions imposed on the importation of newsprint into certain countries.

Imports

Changes recently made in official regulations have further delayed the release of United States newsprint import statistics. All we have available at present are the figures for eleven months of 1947 which indicate a record total for the year of about 3,890,000 tons or 400,000 tons more than in 1946. On the basis of the eleven months' record, 92 percent will have come from Canada, 5 percent from Newfoundland and 3 percent from Europe. The indicated 1947 total from Canada is the largest on record; imports from Newfoundland are below those of last year while those from Europe are much greater than in 1946, but only one-half the average in the years 1935-1939.





The largest tonnage of European newsprint came from Finland with 68 percent of the indicated 125,000 tons of overseas imports originating in that country. Sweden, supplying approximately 16½ percent of the total was next in importance. The balance was represented by relatively small quantities from France, Norway, Austria, Poland and the Netherlands.

Stocks

The 102,000 tons of newsprint reported in stock by all North American producers at the end of last year was 60,000 tons below that on December 31, 1946, and was lower than at any year-end in the past 15 years. On the same date the newspapers reporting to the American Newspaper Publishers Association had stocks on hand or in transit amounting to 377,000 tons, which adds up to a total of 479,000 tons for these two groups. There was an increase over 1946 of 84,000 tons in the quantity held by these publishers, but it was largely counterbalanced by the decrease in manufacturers' stocks so that there was a net increase of only 24,000 tons.

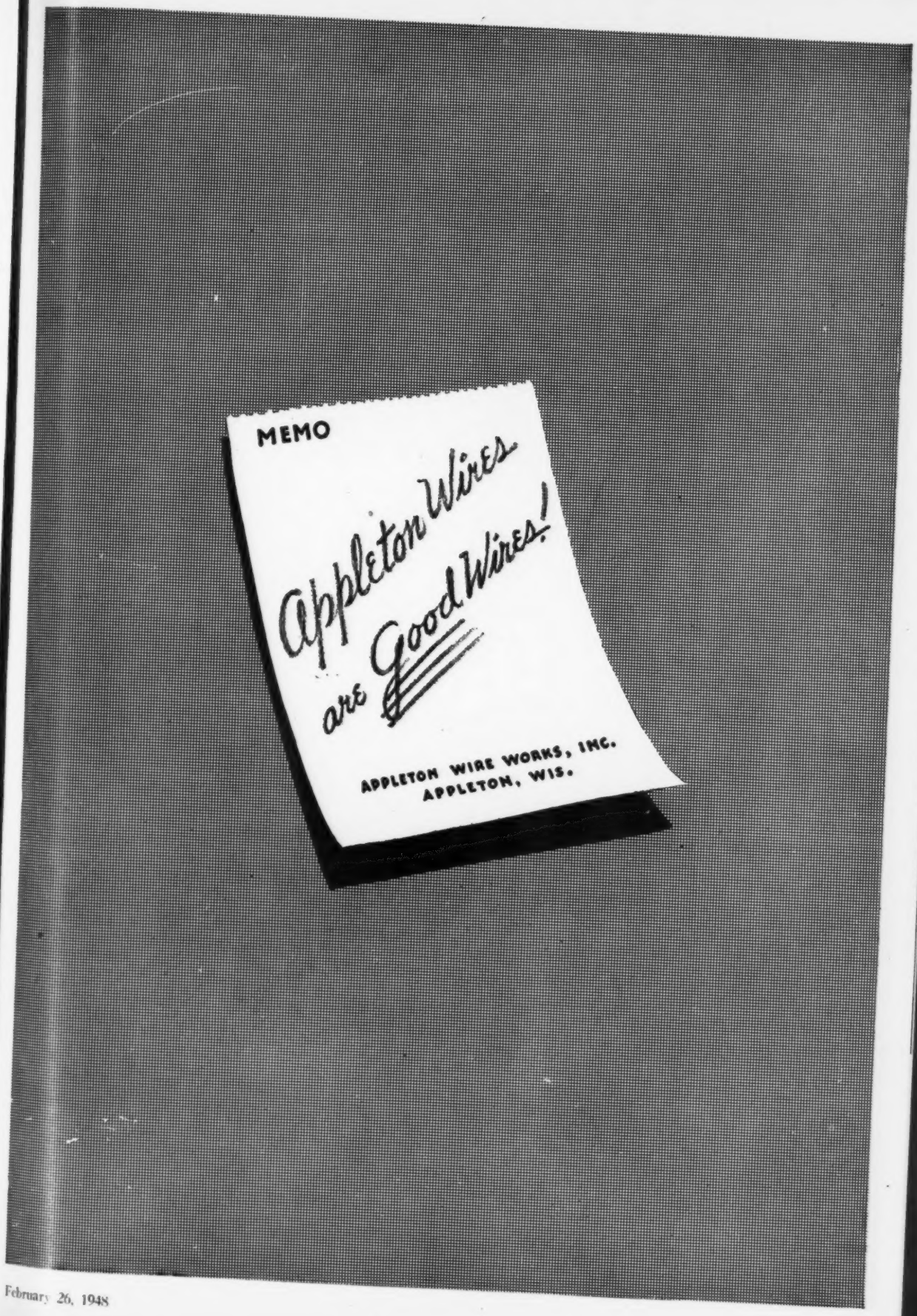
There has been an increase in A.N.P.A. publishers' stocks of 111,000 tons from their recent year-end low of 266,000 tons in 1945, but they are 102,000 tons below those at the end of 1942 and 8,000 tons less than at the close of 1941. In relation to present consumption they are by no means excessive since at the end of last December they were equal to only 36 days usage. While they had 5 days' more supply than at the end of 1946 it was, however, below that at the end of any December since 1936.

Consumption

In view of record-breaking newspaper advertising linage and circulations apparently at an all-time peak, it is not surprising that more newsprint paper was used in the United States last year then ever before in history. Despite the record usage there still were many complaints about inadequate supply.

The publishers reporting to the ANPA used in round numbers 3,565,000 tons of newsprint paper in 1947—an increase of 429,000 tons or 14 percent over the quantity used in 1946. This was the largest consumption ever reported by this group and exceeded all previous peaks by substantial margins.

Consumption in every month of the year showed an appreciable percentage increase over that of the corresponding 1946 month with a peak increase of 21 percent recorded in January, while the July increase of 8 percent was the smallest. In addition to July, there were only two other months—August and December with increases of 9 percent—that failed to exceed the 1946 record by more than 10 percent. Daily consumption of paper by this group in the final three months of last year was in


MEMO
Appleton Wires are Good Wires!
APPLETON WIRE WORKS, INC.
APPLETON, WIS.

excess of 10,000 tons for the first time on record, with daily use in November rising to more than 11,000 tons.

It is estimated that the ANPA publishers used 75 percent of the newsprint consumed in the United States in 1947. Based on this assumption, total use of this grade of paper amounted to 4,753,000 tons last year. This was an increase over 1946, the previous record consumption year, of 457,000 tons or about 10½ percent, and 823,000 tons or 21 percent above that in 1941.

Newsprint paper consumption, Census Bureau estimates of population in the United States as of July 1 and the calculated pounds of paper used per capita since 1929 are as follows:

Year	Population	News Print Paper Used Tons	Per Capita
1929	121,526,000	3,780,000	62.2
1930	123,091,000	3,563,000	57.9
1931	124,113,000	3,245,000	52.3
1932	124,974,000	2,840,000	45.4
1933	125,770,000	2,690,000	42.8
1934	126,626,000	3,058,000	48.3
1935	127,521,000	3,300,000	51.7
1936	128,429,000	3,650,000	56.8
1937	129,257,000	3,830,000	59.3
1938	130,215,000	3,458,000	53.1
1939	131,878,000	3,550,000	54.1
1940	132,817,000	3,730,000	56.2
1941	133,923,000	3,930,000	58.7
1942	134,633,000	3,800,000	56.4
1943	136,497,000	3,650,000	53.5
1944	138,101,000	3,250,000	47.1
1945	139,621,000	3,480,000	49.8
1946	141,229,000	4,296,000	60.8
1947	143,382,000	4,753,000	66.3

For the first time since 1929 consumption has exceeded the growth in population in this country. The 1947 per capita figure of a little more than 66 pounds was 5½ pounds above that in 1946 and 4 pounds greater than the previous all-time high of 1929.

Sizes

Leading newspapers published in 39 cities throughout the United States not only were substantially larger in size last year than in 1946, but were also larger than in any one of the preceding seventeen years.

Sunday newspapers averaged 94 pages in 1947 and were 10 pages or 12 percent above the average in 1946 and were 26 pages above the war-time low of 68 pages in 1944. While this average was greater than in any year since 1929, it was considerably below both that year and those immediately preceding it. The greatest increase in size over the corresponding months of 1946 occurred in May and September when it amounted to 14 pages, while the month of August registered an increase of only 3 pages. The average for the month of October was 104 pages and that for November was 105 pages, and this was the first time the 100 page average was exceeded in any month since November 1929.

Leading daily newspapers did not show as great an increase as those issued on Sunday, but nevertheless were almost 7½ percent larger in size than in 1946. They averaged 29 pages during 1947 or 2 pages more than in 1946 and were equal to or higher than in any year since 1929. Only in the month of July—when they equaled the 1946 average—the dailies failed to exceed the similar month of the preceding year. The October average of 33 pages was the highest of the year and the 4 page increase over the same month of 1946 was higher than that recorded by any other month in 1947.

Circulations

The *Editor & Publisher* tabulation of English-language newspaper circulations in the United States for the year ending September 30, 1947, is not yet available, but the annual cross-section survey made by the above-mentioned publication indicates that circulations are continuing their upward trend but at a somewhat slower rate than in 1946.

This survey based on publisher's statements to the Audit Bureau of Circulations for the six-month period ending September 30, 1947, and estimated to represent almost two-thirds of the week-day and approximately three-fourths of the Sunday circulations discloses a gain of 2 percent for the dailies and 5 percent for Sunday newspapers over the corresponding period of 1946. In the daily field, morning newspapers recorded an increase of a little more than 2 percent, while evening paper circulations showed an increase of not quite 2 percent.

This increase in newspaper circulations has been attained in the face of further increases in newspaper prices and predictions made by some that there would be a decline from war-time levels have not been borne out to date.

Advertising

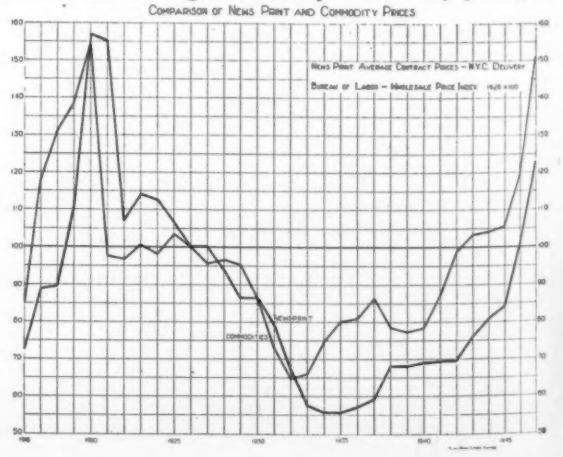
Advertising in general not only had a good year in 1947, it was moreover the best on record. However, not all media did equally well. Of the three major media, advertising in newspapers—despite necessary rationing of space by many publishers—scored the most impressive gains over the preceding year.

Newspapers

Newspapers in the 52 major cities of the United States tabulated by Media Records carried the record total of 2,009,000,000 agate lines of advertising in 1947. This exceeded the total of the previous record year of 1929 by 111,000,000 lines or 6 percent, and was 279,000,000 lines or 16 percent above 1946. It was also 943,000,000 lines or 88½ percent above the depression low of 1933.

Linage in every month of 1947 was substantially in excess of that in the corresponding month of the preceding year. The largest increase was 21 percent in January followed closely by 20 percent in May and October and 19 percent in November. The 9 percent increase in the month of August was the smallest.

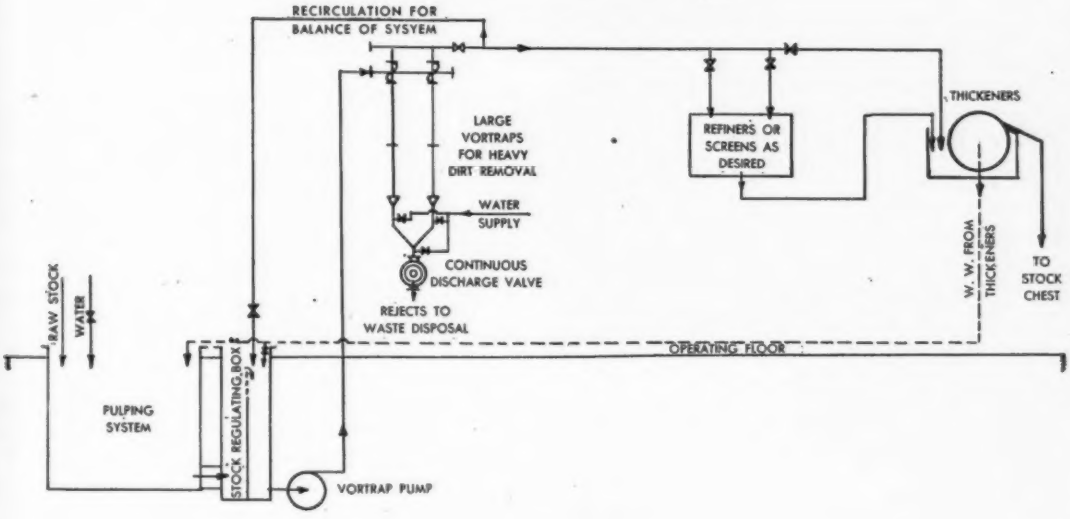
In making long-time comparisons, we find that in ten of the twelve months of 1947—the exceptions were March and May—linage was greater than in any similar month on the record going back to 1928. Furthermore, we find that the highest monthly total in any prior year


Comparison of News Print and Commodity Prices
News Print Average Contract Prices - N.Y.C. Delivery
Bureau of Labor - Wholesale Price Index

SIMPLE and EFFICIENT
DIRT REMOVAL

For Waste Paper and Rough Stock Systems

VORTRAPS



Four Outstanding Features—

1. Replaces the old ideas for heavy Dirt Removal.
2. Takes out dirt at source to reduce wear on pumps—Jordan fillings and wires.
3. Continuous operation with minimum of operating labor required.
4. Space savings reducing building costs.

Why not ask for details.

NICHOLS ENGINEERING & RESEARCH CORPORATION
60 WALL TOWER, NEW YORK 5, N. Y.
University Tower Bldg., Montreal, Canada

—that of 182,490,000 lines in October 1929—was exceeded in each of the last three months of 1947. October linage was the largest of any month last year and was greater than that of the same month eighteen years earlier by almost 9 percent.

With the exception of financial linage, all classifications were materially above 1946, but only two of them —retail and classified—were greater than in 1929. Automotive advertising registered the largest percentage increase over the preceding year, but yet was less than half the 1929 total. The financial classification although 7 percent below 1946 was greater than in any other year since 1935. Department store advertising, which is included in, and represents 38 percent of the retail total, for the second successive year exceeded all previous records.

The Bureau of Advertising of the ANPA estimates that newspaper expenditures of national advertisers in 1947 amounted to an all-time high of $372,000,000 or an increase of approximately $100,000,000 or 38 percent above 1946. Another estimate places total newspaper advertising revenues in excess of $1,000,000,000 in 1947.

The American Press Association reports that estimated expenditures by all advertisers in 8,300 weekly newspapers published in communities of less than 50,000 population last year totaled nearly $50,000,000. National advertising linage in these papers amounted to 298,388,000 lines valued at $9,590,000. Since no similar data are available, it is not possible to make comparison with previous years.

PERIODICALS

Magazine advertising linage in 1947 as reported by *Printers' Ink* was 7 percent below that of the preceding year, only 8 percent more than in 1945, but more than double the volume in 1942. In the first half of the year it pursued an erratic course with two months recording increases over 1946, while the other four months had decreases ranging from less than one percent up to 6 percent. However, in the July-December period the decreases were consistently material. The smallest percentage decrease in the last half of the year was that of 9 percent in July, while the largest was in December when the total was 14 percent below that of December, 1946. Total linage in the months of August, November and December last year also was below that in the corresponding months of 1945.

The Magazine Advertising Bureau has estimated total 1947 magazine advertising volume at $440,000,000, an increase of $59,000,000 or 15 percent over the preceding year and nearly twice the volume in 1943.

RADIO

Information in regard to advertisers' expenditures via radio is at present by no means complete. Gross time sales of the four major networks have been estimated at approximately $190,000,000 or about 1½ percent under 1946 sales and about equal to those in 1945 and 1944. There is yet no information available in regard to local and regional network billings which in recent years have exceeded in total those of the 4 major chains.

A study released some time ago by the Federal Communications Commission indicates the probability that by the end of 1948 about 2250 standard broadcast stations will be on the air—about 400 more than there are daily newspapers. This report also points out that the continued existence of many of the new stations will depend greatly on their ability to get a larger share of the local advertisers' dollar—the lion's share of which at present goes to newspapers.

While there has been a good deal of progress in television in the past year, it is not yet an important factor in the advertising field, although the time may not be too far off when its impact may be strongly felt by other media.

Outlook

The post-war boom continues without as yet any real indications of a decrease in overall activity. Past experience teaches, however, that all periods of high-level activity, sooner or later, come to an end.

There still remains a large demand for durable goods of all kinds and overall buying power appears sufficient to maintain business at its present peak for some time. Most observers seem to be in agreement that the current high rate of activity should continue at least through the first half of this year to be followed by a more or less mild decline during the last six months. There also have been a few dire predictions of a major reaction to occur in 1948.

Present indications are that demand for newsprint paper, at least in the immediate future, will be such that the fullest possible use of productive capacity will be necessary in order to keep pace with it.

Woodpulp Faces Triple Problem

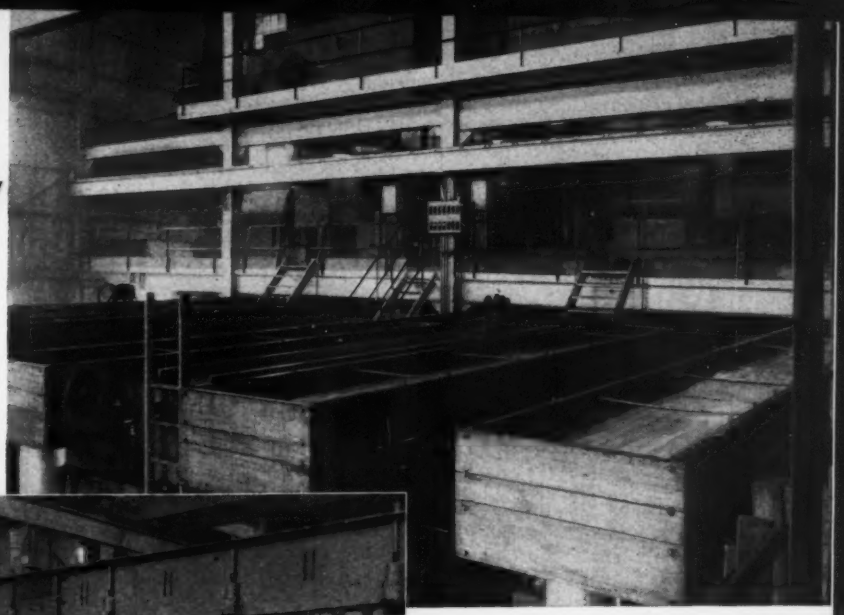
By O. F. Swanson, President, Pulp & Paper Trading Company and General Manager, J. Andersen & Company

Three outstanding developments featured the wood pulp industry during 1947. First, was the record-breaking production achieved by pulp mills in the United States and in Canada, which exceeded the previous all-time high mark established in 1942 in the United States by 1,168,118 tons. However, this increased production by North American mills together with an appreciable gain in total importations of pulp over the preceding year failed to prove sufficient to close the gap between supply and demand, although it succeeded in narrowing it to some extent toward the close of the year.

Figures issued by the Bureau of the Census of the U. S. Department of Commerce put the United States production of wood pulp in 1947 at 11,951,548 short tons, an increase of 1,345,021 tons over 1946. Imports into the United States last year totaled 2,303,241 tons, a raise of 508,472 tons above the year preceding, of which Canada supplied approximately 65 per cent and the northern European countries the balance.

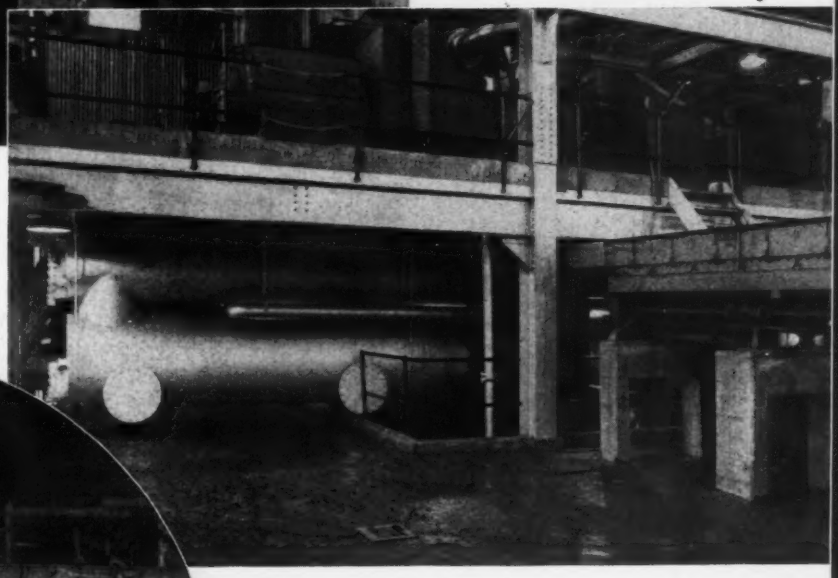
Even this formidable expansion of available tonnage did not check the gradual increase in prices, which kept advancing throughout the year. There was and still is a shortage of wood pulp in the American as well as in other consuming markets. Particularly is this true with regard to bleached pulp, of which the inadequate supply is still keenly felt and probably will continue for at least another year. Second, the regional price fixing brought about a condition which cannot be recollected as having ever existed in previous years. For instance, contract prices on overseas unbleached sulphite and unbleached kraft pulp were higher than those quoted on American and Canadian bleached chemical pulp, which would imply that manufacturers

...for Higher Capacity ...for Finer Quality

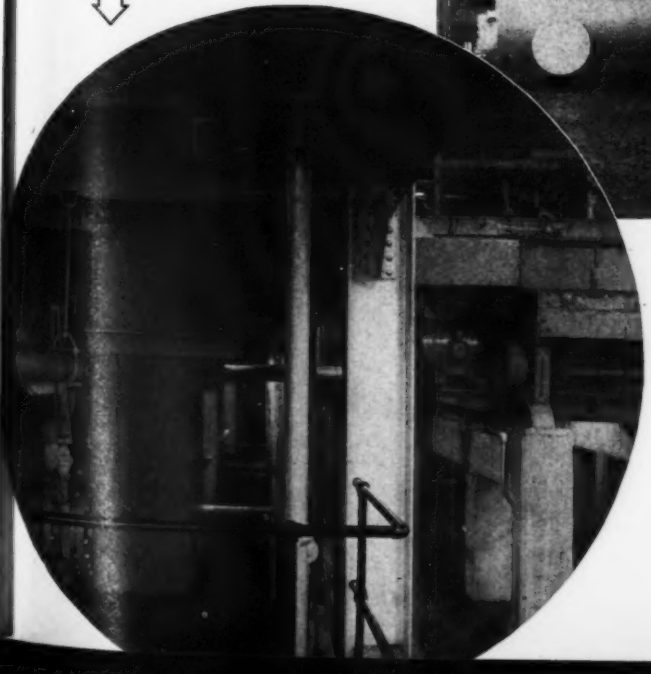


Two Stock Volume Meters with Consistency Regulators govern steady flow through Impco Knotters and Screens

Bronze Vat Screens, two per line mounted for easy maintenance



Pressure Stock Headers with Submerged Inlets and "Forming Aprons" for uniform distribution to Screens



"From Cooking to Use"

IMPCO

Pulp Mill Equipment

on this continent were in favor of pursuing a more cautious policy with respect to prices on their pulp. Regional prices were farther apart than ever before and still are. Differences of $25.00 to $50.00 per ton between prices of United States and Canadian pulp and pulp from overseas, and in a few instances even more, prevailed during the year. The increased costs of manufacture in the northern European countries is supposed to be the cause of this.

The third development was the installation of new and additional equipment in pulp and paper mills on the North American Continent, which combined with the very cooperative spirit between buyers and sellers had a great bearing on the much larger tonnage produced here in 1947.

In common with other boom years, it is safe to say without fear of contradiction that 1947 will go down in the annals of the industry|s history as one of the most prosperous years in the last several decades. Whether this can be said of European pulp-producing countries is doubtful, because countries more dependent on imported raw materials than we happen to be must have had a difficult time in keeping their pulp and paper mills running at full tilt.

Sweden was, for many years, the biggest exporter of wood pulp, and as late as 1939 exported close to two and a half milion tons, of which the United States received a large share. If for some reason or another, Sweden cannot compete in this market in the future when competition becomes normal, it is reasonable to assume that she will be obliged to readjust her pulp distribution and perhaps find it necessary to reduce shipments to the American market.

The particularly good quality of wood pulp made in Sweden, Finland and Norway is attributable in large measure to the northerly forests and the slow growth of the trees. Manufacturers in those countries are also old hands at pulpmaking, and have played a leading role in the technical developments for many years. This has been true ever since C. D. Ekman in 1874 solved the problems of producing sulphite pulp in a practical manner at Bergvik, Sweden. The mill he then built there is reputed to have been the first in the world, and although it still is intact, it is not running, although the newer and large mills of the Bergvik Company are busily engaged in manufacturing sulphite and kraft pulp of excellent quality.

Wood pulp today is not only important for paper and board manufacture, but has entered the synthetic field and also has invaded the sphere of plastics. During the war years, at least one million tons of so-called Fodderpulp was made abroad. Also synthetic albumen or so-called fodderyeast was made. Ethyl alcohol, which for a time was principally used for motor fuel, is one of the important by-products. It is estimated that about 135 quarts are obtained in producing a ton of viscose pulp, and that the production now exceeds one million quarts a year. Recently this alcohol has been refined for use in the manufacture of the famous aquavit and other liquors of that type. There also are tall-oil and other important by-products, too numerous to enumerate here.

Although the pulp wood supply on the North American continent has decreased considerably in recent years, it is believed the remaining forests can provide sufficient timber to take care of the present production of wood pulp for many years to come.

Probably there are many in the industry today who do not know that paper made from wood pulp was first manufactured in the United States in a paper mill at Lee, Mass., in the year 1854. Two papermakers in Germany, Gottfried Keller and his friend, Heinrich Voelter, a paper mill mechanic, conducted experiments in imitating the process used by wasps to utilize wood fibre in the construction of their nests. These men started to grind wood with a large grindstone and using large quantities of water in the grinding. Their process produced pulp similiar to a rag pulp, but not so fibrous or strong, so they added a small proportion of rag stock and discovered they could make the raw material into paper with considerable tensile strength that would quickly absorb printing ink. Voelter invented a machine for grinding wood into pulp. Subsequently, two grinders were purchased for shipment to the United States. These machines arrived here in December, 1866 and were installed by Frederick Wurtzbach, whose inventions later improved the quality as well as the quantity of the mechanical wood pulp produced. The present-day news print paper industry owes a great deal to these pioneers in the pulp field.

After much experimentation, it was in the early part of 1867 that the first groundwood mill to make wood pulp of acceptable quality and on a commercial scale was established in the United States at Curtisville, Mass., whence it was hauled to the Columbia mill of the Smith Paper Company in Lee, Mass. The price for the Groundwood pulp at that time was 8 cents per pound. Ultimately, the production and use of groundwood pulp spread over nearly all the world, and such pulp is today the principal raw material in the manufacture of newsprint as well as some other kinds of paper.

In the event of a serious shortage of pulp wood developing, there will always be Alaska to fall back upon. Surveys conducted by our Goverment have shown Alaska has enormous forest resources which are not being utilized, and in my opinion it is only a matter of time when some aggressive manufacturers will be producing wood pulp on an extensive scale in Alaska.

New TAPPI Members

J. Marshall Buehler, Student, Marquette University, Milwaukee, Wisconsin.

Robert R. Davis, Assistant Technologist, Sinclair Refining Co., East Chicago, Indiana, a 1947 graduate of Colorado School of Mines.

Mary L. Eakin, Librarian, Forestry Library, University of California, Berkeley, California, a 1937 graduate of the University of Tulsa.

Chester O. Halverson, Superintendent, Technical Department, Badger Globe Mill, Kimberly-Clark Corp., Neenah, Wisconsin, a 1935 graduate of the University of Wisconsin.

William L. Hilfrank, Pulp and Paper Mill Specialist, General Electric Co., Boston, Massachusetts, a 1918 graduate of Rensselaer Polytechnic Institute.

Lyle C. Jenness, Acting Head of Chemical Engineering Department, University of Maine, Orono, Maine, a 1925 graduate of the University of Maine with an M.S. degree.

H. Franklin Jones, Chemist, General Electric Co., Pittsfield, Massachusetts, a 1941 graduate of the University of Illinois, with an M.S. degree.

Martin F. Schnaufer, Chief Engineer, Detroit Sulphite Pulp & Paper Co., Detroit, Michigan, a 1938 graduate of Michigan College of Mining and Technology.

Jack M. Shore, Salesman, Calco Chemical Division, North American Cyanamid Ltd., Montreal, P. Q., Canada. Attended Huddersfield Technical College.

THAT GRAND AND GLORIOUS FEELING

Management—When you install Orr-Chem felts, the *chemically-treated kind,* and discover a little later that they stayed on longer, did a better job of draining, and required fewer wash-ups, it's only natural that you should get "that grand and glorious feeling." To reduce felt cost per ton produced is always a welcome experience.

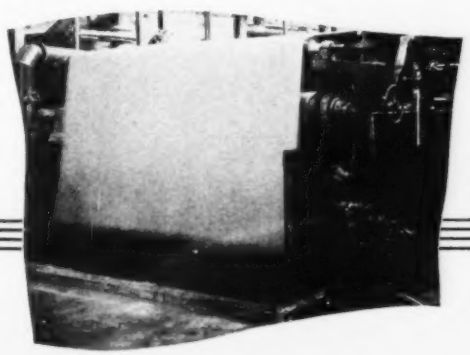
Mill Personnel—When, in mills operating on a production incentive plan, it dawns on the men that Orr-Chem felts effect such economies and that their pay envelopes will reflect the saving, they, too, are more than pleased.

Stockholders—Although probably not in touch with operating developments, stockholders certainly do appreciate a good statement, another place savings on felting and upped production will show up.

The past year many mill case histories have been published. Many more are available and with practically every type of mill and practically every grade represented. They make an interesting study of the entire Orr-Chem development.

If you are not already an Orr-Chem enthusiast, it will pay you well to give these chemically-treated felts a trial.

THE ORR FELT & BLANKET CO.
PIQUA, OHIO



ORR·CHEM

Casein Still Presents a Question

By Nils Anderson, Jr., Casein Company of America

Although 1947 ushered in a year free of any United States Government controls, the Argentine Government was controlling their casein prices.

The early months of 1947 showed that dairy products in general in the United States were seeking their own level in relation to the supply and demand. The prices on all dairy products, including casein, were receding at a rather rapid rate. Under the Steagall Act, which terminates the end of 1948, our Government is obligated to support prices of agricultural products, thereby stimulating the production of edible materials at the expense of casein production. Producers in the United States were unable to compete for the skimmilk, which could command a higher price from producers of skimmilk powder. If the Argentine Government had continued maintaining its high price for casein, substantially larger quantities of casein would have been produced in this country during our flush. However, the world price of casein had declined to such a low level in May that the Argentine Government indicated that they would release their controls on the export and sales price of casein. This immediately reflected alarm in this country, because lower prices could be expected and, of course, lower prices were quoted.

Therefore, we saw a decline in the price of casein from 50c per pound in January to as low as 22c per pound in June. Evidently consumers thought that the price was going to go lower and, therefore, held their purchases for a later date. Lower prices were not realized. When consumers began to purchase, they found stocks, which were thought to be large, low, and immediately the price increased to around 32c per pound. We were in the position then of having to depend on supplies from the Argentine.

Domestic casein prices have been relatively stable since the flush, in spite of the fact that there is practically no domestic casein available. This short supply condition will exist until the flush season this year.

Argentine casein prices have been relatively stable since our flush ended and prices have ranged between 28½c and 32c per pound.

Although foreign countries purchased casein from the Argentine throughout the year, some changes were noted which eliminated the speculative trend of the year 1946. For instance, European countries were running out of dollars during 1947, and were unable to purchase in as large quantities as they desired. Countries which had not produced casein in any quantities in 1946

EXPORTS FROM THE ARGENTINE
Metric Tons—2204 Pounds
1947

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Africa	....	....	....	....	....	....	....	....	....	....	....	....	....
Barbados	....	....	....	....	....	....	....	....	....	....	....	....	....
Belgium	141	80	74	126	37	123	228	99	128	10	50	25	1121
Bolivia	....	....	....	....	....	....	....	....	....	....	....	....	....
Brazil	10	18	11	23	25	66	60	50	....	10	4	4	281
Br. Guiana	....	....	....	....	....	....	....	....	....	....	....	....	....
Ceylon	....	....	....	....	....	....	....	....	....	50	....	....	50
Canary Islands	....	....	....	....	....	....	....	....	....	....	....	....	....
Colombia	....	....	....	4	....	14	....	....	....	....	....	....	18
Costa Rica	....	....	....	....	....	....	....	....	....	....	....	....	....
Cuba	....	1	....	....	....	....	....	....	....	....	....	1	2
Chile	....	....	5	....	....	5	....	4	....	15	....	....	29
China	....	5	4	....	....	3	....	25	....	5	....	20	62
Czech	....	....	....	....	....	....	....	....	....	....	....	....	....
Dom. Republic	....	....	....	....	....	....	....	....	....	....	....	....	....
Dutch Guiana	....	....	....	20	....	....	....	....	....	....	....	....	20
Ecuador	....	....	....	....	....	....	....	....	....	....	....	....	....
England	865	1350	1300	900	400	700	....	350	500	300	800	28	7493
Finland	....	170	100	....	....	230	....	714	100	140	....	280	1734
France	75	175	10	....	....	....	....	....	....	....	....	....	260
Greece	....	....	....	....	7	....	....	19	....	....	18	30	74
Germany	....	....	....	....	....	....	....	....	....	....	90	....	90
Ireland	....	....	....	....	....	40	....	....	....	....	....	....	40
Italy	....	74	1	....	31	....	2	100	433	49	228	....	918
Holland	80	....	105	100	40	20	30	....	100	60	5	20	560
Honduras	....	....	....	....	....	....	....	....	....	....	....	....	....
Jamaica	....	....	....	....	....	....	....	....	....	....	....	....	....
Malta	....	....	....	....	....	....	....	....	....	....	....	....	....
Mexico	....	44	....	....	5	44	1	30	....	13	40	10	187
Neth. Guiana	....	....	....	....	....	....	....	....	....	....	....	....	....
Nicaragua	....	....	....	....	....	....	....	....	....	....	....	....	....
Norway	15	95	....	35	....	49	60	14	....	115	5	....	388
Palestine	....	....	....	....	....	20	15	9	....	....	15	14	73
Panama	....	....	....	....	....	....	....	....	....	....	....	....	....
Paraguay	....	....	....	....	....	....	....	....	....	....	....	....	....
Peru	....	....	....	....	....	2	8	....	....	....	....	1	11
Puerto Rico	....	....	....	....	....	....	....	....	....	....	....	....	....
Portugal	25	....	25	10	....	21	5	....	....	....	1	....	87
San Salvador	....	....	....	....	....	....	....	....	....	....	....	....	....
So. Africa	85	2	28	....	20	30	....	23	10	....	2	....	200
Spain	....	....	500	465	35	500	80	875	....	....	....	....	2455
Sweden	192	....	201	135	61	286	35	560	266	34	152	41	1963
Switzerland	....	....	10	20	204	244	262	80	50	210	57	75	1212
Trinidad	....	....	....	....	....	....	....	....	....	....	....	....	....
U. S. A.	1840	75	....	60	....	....	500	1470	951	873	1060	2426	9255
Uruguay	....	....	....	....	....	....	....	....	....	....	....	....	....
Venezuela	10	....	....	5	....	25	....	16	....	....	5	....	55
India	....	....	....	....	7	2	....	....	....	....	....	....	9
Morocco	....	....	....	....	10	....	....	....	....	....	....	....	10
Denmark	....	....	....	....	100	....	....	....	....	....	....	....	100
Miscellaneous	....	....	....	....	....	....	....	....	....	....	....	3	3
Totals	3338	2089	2374	1903	882	2524	1256	4152	2538	1884	2532	2978	28760

QUALITY PAPER....
QUANTITY PRODUCTION....
APPLETON
FELTS
Appleton
Woolen
Mills
APPLETON
WISCONSIN

DRY CASEIN PRODUCTION U. S. A.

	Short Tons—2000 Pounds			
	1944	1945	1946	1947
Jan.	438	333	177	1271
Feb.	474	355	237	1144½
Mar.	596	507	383	1280
Apr.	805	781	670	1451
May	1185	1209	1282	1902
June	1463	1375	1710	2245½
July	843	870	1155	1820
Aug.	480	405	775	1537½
Sept.	374	320	513	1265
Oct.	322	247	460	875
Nov.	203	130	650	432½
Dec.	258	145	1075	442½
Totals	7441	6677	9087	15666½

ARGENTINE IMPORTS TO U. S. A.

	Metric Tons—2204 Pounds			
	1944	1945	1946	1947
Jan.	3250	432	895	1840
Feb.	803	1054	2205	75
Mar.	1637	3693	1255	....
Apr.	1133	2640	625	60
May	202	1804	3296	....
June	3013	3168	1474	....
July	2750	1202	2836	500
Aug.	1673	2899	1143	1470
Sept.	2020	1245	1169	951
Oct.	2673	1409	1224	873
Nov.	....	650	960	1060
Dec.	3341	2333	1847	2426
Totals	22495	22529	18929	9255

TOTAL ARGENTINE EXPORTS

	Metric Tons—2204 Pounds			
	1944	1945	1946	1947
Jan.	4650	1791	1305	3338
Feb.	3727	1428	3949	2089
Mar.	2472	4078	3471	2374
Apr.	1149	3159	1828	1903
May	1349	2933	4408	882
June	4370	4124	2304	2524
July	4044	1880	3538	1286
Aug.	3469	3950	2762	4432
Sept.	2227	2342	2817	2538
Oct.	3280	1917	1974	1884
Nov.	1330	1852	1338	2532
Dec.	3458	4292	2586	2978
Tot's.	35525	33746	32280	28760

ARGENTINE PRODUCTION

	Metric Tons—2204 Pounds			
	1944	1945	1946	1947
Jan.	3250	2731	3000	2927
Feb.	2832	2690	2500	2630
Mar.	2743	3308	2500	2814
Apr.	2345	2748	2773	2491
May	1915	2296	2676	2400
June	1705	1673	2650	2400
July	1562	1341	1974	2038
Aug.	1677	1565	2047	1923
Sept.	1762	2361	2434	2178
Oct.	2306	2631	3112	3466
Nov.	3193	3031	3419	3535
Dec.	3050	2834	3461	3800
Tot's.	28340	29209	32546	32602

showed signs of producing substantial quantities which relieved that particular country of the necessity of importing from the Argentine. Consumers in this country in 1947 greatly reduced their consumption of casein and had substitutes readily available in the event that casein prices returned to the high levels of 1946.

The prospects for production and consumption of casein in the United States for 1948 are uncertain. A great many factors, which are unknown at the time of this writing, will affect production and prices on casein and casein substitutes. If the Marshall Plan goes through in any form, foreign countries will immediately place a demand in the Argentine for casein. It will also tend to tighten up dairy products in the United States, so that we could very easily go through a year in which very little skimmilk would be available for the production of casein.

Exports to the United States from the Argentine amounted to only 9,255 metric tons in 1947 as against war years' importation of from 23,000 to 24,000 tons. In spite of this huge decline in imports of Argentine casein into the United States, Argentine shippers exported a total of 28,760 tons to all countries as against a total of 32,280 tons in 1946. These figures are evident in the tables.

It was estimated that the United States would produce approximately 20,000 short tons during 1947. However, production amounted to only 15,666 tons. United States production in early 1948 has been a good deal lower than for the corresponding period in 1947.

It should be noted that Argentine production for the last two years has been normal due in part to ideal weather conditions. However, they do have occasional seasonal droughts which practically wipe out milk production.

It has been noted that Argentine production costs have increased greatly in the past few years. This has been due mainly to the Government's controlling the price of butter. Producers of butter must sell their production to the Government at a relatively low figure and any profits over and above the profits made from butter sold to the Government must be made from the sale of casein and other products. On top of this great social progress has been made and high wages have been forced on Argentine producers.

Although casein production has been stimulated in other producing countries, this has been offset by purchases by countries such as Japan and Germany. It is expected that they will continue to buy in larger quantities as their economies become more stabilized. In prewar years Japan and Germany have taken about 25 percent of the total casein exported from the Argentine.

Stocks of casein throughout the world are undoubtedly very low. It has been rumored that stocks are large in the Argentine. However, after glancing at the export figures versus production figures, it would be the opinion of most Argentine shippers that there is a stock of not more than 8,000 or 9,000 tons (50 percent sold and awaiting shipment) in the Argentine with known stocks to be very low in all parts of the world.

With stocks in the United States at an all-time low on January 1, 1948, of 1,275,000 pounds, which is less than a week's supply, we can figure that casein will be reasonably tight until it is definitely known what will occur during our flush. This will not be realized until some time in May. In the meantime, consumers should watch their position because it is doubtful that there will be any worthwhile domestic production at least until some time in April, and possibly May.

At left: HUGO HANSON, President, W. C. Hamilton & Sons

At right: COL. E. C. HARWOOD, who addressed Sulphite Group

Du Pont reds for papers

DU PONT BRILLIANT CROCEIN FL EXTRA CONC.
DU PONT CONGO RED
DU PONT CROCEIN SCARLET N EXTRA
DU PONT FUCHSINE CONC. POWDER
DU PONT PURPURINE 4B CONC.
DU PONT RHODAMINE B EXTRA
DU PONT RHODAMINE 6GDN EXTRA
DU PONT SAFRANINE T EXTRA CONC. 125%
HALOPONT* BRILLIANT PINK 2B
LITHOSOL* RED CSP
PONTACYL* CARMINE 2B
PONTACYL* CARMINE 2G CONC. 150%
PONTACYL* FAST RED AS EXTRA CONC.
PONTACYL* RUBINE R EXTRA CONC. 125%
PONTACYL* RUBY PL EXTRA CONC. 200%
PONTAMINE* FAST PINK EB EXTRA
PONTAMINE* FAST RED 8BL CONC. 125%
PONTAMINE* FAST SCARLET 4BS CONC. 150%
PONTAMINE* RED 12B EXTRA CONC. 200%

Among this list of reds, the paper dyer will find colors particularly suited to his specific requirements of shade, fastness, application method, furnish and cost. And, more important, Du Pont offers the assistance and "know how" of its Technical Staff in helping solve your color problems. E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

* Reg. U. S. Pat. Off.

Du Pont Dyestuffs

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

TAPPI Prepares Bigger Program

By W. F. Gillespie, President, Technical Association of the Pulp and Paper Industry

At this time it becomes the duty of your president to bring to you an annual message. Under the circumstances, I am sure you know that it is not a pleasant duty. I am a substitute and, as such, humbly realize that Worthen Brawn could have done a better job.

The enthusiasm with which Worthen started his work as your president, the broad experience in TAPPI problems which he possessed, the sincerity of purpose which he manifested in our association affairs, all these, coupled with a fine balance of judgment with energy, kindness with firmness, leadership with tolerance, made his passing a loss that cannot be immediately replaced.

W. F. Gillespie

There are a few things that have served to lighten the difficult task I have assumed in attempting to carry on. From individuals, from committees, from local sections, have come friendly and cooperative expressions. There have been criticisms, too, but in every case they have been, in the critic's opinion, for the best interests of the society. Your executive committee has been loyal, hard working and constructive in its efforts. These kindly manifestations of help have made a rough path a little smoother.

In presenting to you several matters of some interest to the association's welfare, the discussion may properly be divided into two parts.

(1) A review of some outstanding accomplishments of the association within the past year.
(2) Plans for the immediate future.

Committees

On more than one occasion, I have stated as my opinion that TAPPI strength is largely a reflection of committee activity. TAPPI is strong, its strength increases yearly, perhaps not spectacularly but always steadily. If the premise is correct, then TAPPI committees are strong. Within the structure, there are several groups whose contributions are outstanding. There are some that are just beginning to show the results of fine committee leadership and personnel and, in a very few cases, the structure has been reorganized in a way bound to produce results. The committee set up in TAPPI, I believe, has no real weak spots and we as a group should be grateful to our committee members who give so much of their time.

Engineering Division

One of the encouraging contributions of TAPPI to its individual, corporate, and sustaining members is the development of the engineering division. TAPPI was originally founded by an engineering group, so the present activity represents a revitalizing of an old interest. That it is successful, is beyond question. As an illustration, of a group of applications for membership that came across my desk a short time ago, about 30 or slightly over that number, 61% were engineers and several of them were chief engineers of paper companies. This division is filling a need long felt in our industry. It is not always fair to mention names for fear of overlooking many who have served well, but, in this instance, I believe you will pardon me for making special reference to Gunnar Nicholson and "Bumps" Hemphill, whose untiring energy and interest have meant so much to this division.

Allied Industry

At this point, it is appropriate to mention the services rendered TAPPI by allied industry. These contributions have been many and varied, and TAPPI is a much stronger group because of the presence of chemists, engineers, and executives from so many fields closely allied to, or serving the paper industry.

Corporate Membership

Still another encouragement to our growing society is the support we are receiving from corporate members. Thirty-four corporate and thirteen sustaining memberships were added last year. This is an appraisal of our activities by top management and, evidently, in this appraisal we have not been found wanting. We, who are here at our company's expense, are here to learn from each other, to give and to get. And any of us, who abuse our company's faith in us by disclosing confidential information is not a worthy representative. But, there are innumerable problems that do not fall in a confidential category that can be discussed freely and openly, and this is the type we are here to discuss. Apparently, top management approves what we are doing and lets each of us see that we warrant this approval.

Financial Status

The financial position of your society is sound. T.A.P.P.I. reserves are adequate to meet a fairly heavy drain. You will realize that the reserves have dwindled considerably in value, if not in number. They are safely invested with a return commensurate with security and this happy situation is due to the vision of one of your past presidents. At the same time, it is your president's opinion that present income should be spent on increasing T.A.P.P.I. services and not T.A.P.P.I. reserves.

Much has ben said about the mystery of T.A.P.P.I.'s financial statement. There is no mystery about it—it has been and still is TAPPI's policy to give any member a financial statement, if he asks for it. In your president's opinion, it is not advisable to publish this statement—but it should be available to you, and it is available.

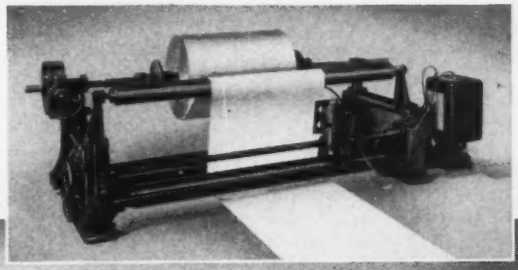
Past Fall Meetings

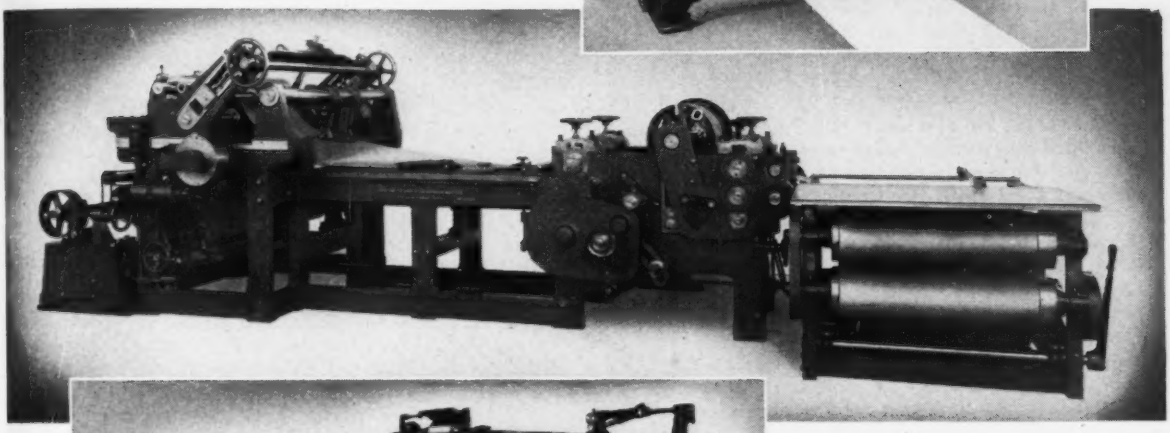
Last Fall, six committees sponsored meetings were held; Fundamental Research at Appleton, Plastics at Syracuse, Alkaline Pulping, and Chemical Products at

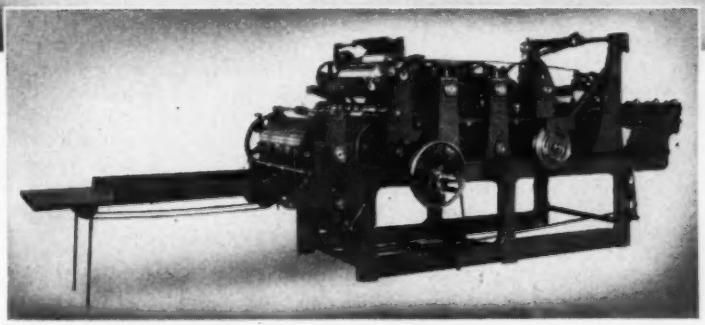
Here's a combination that gives . . .

INCREASED BAG PRODUCTION

LESS PAPER SPOILAGE







TOP

S & W Electric Eye Side Register Control for accurately guiding stock from roll to Tuber.

CENTER

S & W Tuber, for tubes up to 14" wide, 44" long. Side or center seam. Right angle delivery.

BOTTOM

S & W ½ bbl. heavy duty Satchel and Valve Bottomer. Takes tubes up to 28" wide, 60" long.

Smith & Winchester, pioneers in the building of paper bag machinery, have had the experience of many years working with the trade. This close cooperation has resulted in equipment of sound design, extreme rigidity of construction, and many exclusive features for the increased production of high grade bags.

S & W Tubers are designed for pasted or sewed type tubes, of single or multi-wall construction.

S & W Bottomers are built to produce standard satchel and valve bottoms or the combination of the two. Smith & Winchester makes custom-built machines for special requirements.

S

Makers of
PAPER BAG
and
PAPER MILL
MACHINERY

Send for Bulletins

The SMITH & WINCHESTER *Manufacturing Company*

SOUTH WINDHAM, CONN.

SERVING THE PAPER INDUSTRY SINCE 1828

Asheville, Fibrous Agricultural Residues at Alton, and the Engineering Group at Philadelphia. I was privileged to attend all of these, and, to Harry Lewis, Ed Jahn, Ken Chesley, Phalti Lawrence, Sam Aronovsky, and Bumps Hemphill, TAPPI extends its thanks and appreciation for a job well done.

Future Meetings

The Pacific Coast Section has invited TAPPI to have its Annual 1949 Fall Meeting on the Pacific Coast. Only those of you that have had the pleasure of attending a national meeting on the coast fully realize the significance of this invitation. Past performance indicates it will be a never-to-be-forgotten meeting. It is hoped that those committees that are planning to have fall meetings in 1949 will plan them for the coast meeting. I know that all of us appreciate this invitation and it is not too earily to plan to show our appreciation by making arrangements to attend.

Fall Meetings

There will be at least four Fall Meetings this year.

The third engineering conference will be held in Buffalo on October 25-28, with headquarters at the Statler Hotel, and with Westinghouse Electric Company sponsoring the meeting. Preliminary arrangements have been made and you may look forward to another fine meeting.

The Fundamental Research Committee is planning the third of its series. The Detroit meeting in the fall of 1946 dealt with the supply of wood, the 1947 meeting at Appleton had as its theme the chemistry of lignin and the polysaccharides. At Madison, Wisconsin, on August 17-20, the program will be built around the physical properties of wood species.

The Testing division meeting in Pittsburgh on October 11-13, is being planned around several group discussions, dealing with various phases of testing, and it is hoped from these discussions new test procedures of greater accuracy and usefulness will be developed.

The fourth meeting that is planned is a three-day symposium to cover the field of mechanical pulping. This project was originated by Worthen Brawn. One of the last services he rendered TAPPI was to meet with Bob Drummond and Mac to outline a program. The Maine-New Hampshire section is in charge of arrangements. John Parsons, of Hollingsworth and Whitney, agreed to head up the committee. The program expanded until now it has become a joint meeting with the Canadian Technical Section and TAPPI as the co-sponsoring groups. From this meeting it is believed a monograph on groundwood will be developed. It is planned for September 27-29th, at Poland Springs, Maine, and it is hoped and felt that it will be a worthy tribute to the originator of the idea.

Other meetings are being planned, but the details are not sufficiently advanced at this time to make any formal announcement.

Publications

Your publications committee has had the whole publications' policy under consideration. There is nothing particularly new about this. There probably has never been a period in TAPPI's history when the publication's policy has not been under review. It is a continuous process and will never be fully completed.

The decisions to be made are extremely difficult to make; financing, editing, printing, distributing are major items. The situation is changing so rapidly, costs fluctuating, printing output curtailed that the problems necessitate a cautious analytical approach. Hasty decisions are likely to be but poor guesses. Your executive committee would be negligent in its duty if, under the present circumstances, it resorted to guessing.

There is a unanimous desire to provide TAPPI members with the best possible publication's service commensurate with TAPPI's ability to pay the bill. And TAPPI has no apology to offer for its present service to members. Fifty-seven per cent of the TAPPI budget is spent for direct service to its members, and from 12-15 per cent additionally in indirect publications service. At the same time, individual members contributed 47 per cent of the actual expended budget for 1947. Each individual member in this room is receiving approximately $3.50 per year more in publication's service than his annual dues. In spite of this excellent record, your executive committee is earnestly trying to further improve the service.

New Journal

Part of the membership, and we believe a substantial part, has felt that TAPPI is big enough to sponsor its own official publication. This suggestion has been under study for at least a year and a half. All angles have been thoroughly investigated and it is the consensus of opinion within the executive committee that we should embark on such a venture, beginning January, 1949.

The TAPPI Journal will appear as a monthly publication devoted to scientific articles, local sections and other TAPPI news.

This decision has been made, based on a belief that the quality of our service will be improved thereby. Such improvement will be a gradual one but, within a reasonable period, we are hopeful that a TAPPI journal will take its place among the leading scientific journals of the day. We ask your constructive criticism and your indulgence in bringing this idea to maturity.

We have had some difficulties in getting out our services this year. Technical Association Papers have been greatly delayed, solely because of printing difficulties. The plates for the TAPPI 1948 year book were destroyed on January 23rd, when the printing plant in which the work was being done was razed by fire.

Monographs

New monographs will be released as follows:

(1) The monograph on wood constituents, the outgrowth of the Appleton Meeting, is being distributed now.

(2) The monograph on resins for coating should be ready in a short time.

(3) and (4)—Monographs on pigments and adhesives for coating should be in the printers hands by March 1st.

Four other monographs are being prepared and at least one will be available this year and possible others; these include:

(5) Drying of Paper

(6) Graphic Arts

(7) Water

(8) Machinery for coating

Truly this is an array of publications that any society may look on with pride.

Routine Control Methods

Another service to the membership which we hope will be available shortly, and surely within the year, is a collection of routine control methods. A large number of these are in the editing phase now. The methods are not to be confused with TAPPI Sandards, but are for control operation and for quick qualitative evaluation.

(Continued on page 135)

TAPPI's Forward Strides in 1947 Reflect Industry Progress

By R. G. Macdonald, Secretary-Treasurer, Technical Association of the Pulp and Paper Industry

The general prosperity of the pulp and paper industry reflected itself in the growth and activities of the Technical Association in 1947.

R. G. Macdonald

Membership

Following the pattern of 1946 the membership continued to grow at a rapid rate. There were 506 individual members elected in 1947; 133 resigned or were dropped. On December 31, 1947, the total individual membership was 3101.

There were 34 corporate and 13 sustaining members elected. One corporate and 2 sustaining members resigned. The corporate membership on December 31, 1947 was 201, and the sustaining membership was 164.

The following companies became corporate members in 1947: American Coating Mills, Elkhart, Ind.; Anjala Paper Mills, Ingerois, Finland; Ashuelot Paper Company, Patchogue, N. Y.; L. L. Brown Paper Company, Adams, Mass.; Cartiere Burgo, Torino, Italy; Celanese Corp. of America, Summit, N. J.; Cia. Industrial de Papel Pirahy, Rio de Janeiro, Brazil; Compania de Celulosa de Filipinas, Negros Oriental, P. I.; Courtaulds, Ltd., Coventry, England; Czechoslovak Paper & Woodpulp Mills, Prague, C.S.R.; Donside Paper Co. Ltd., Aberdeen, Scotland; Downingtown Paper Co. Inc., Downingtown, Pa.; "Emballages," Paris, France; Erving Paper Mills, Erving, Mass.; Hummel & Downing Company, Milwaukee, Wis.; Hurlburt Paper Company, South Lee, Mass.; Kajaani OY, Kajaani, Finland; L. Lacroix Fils, Paris, France; Miquel y Costas & Miquel, S. A., Barcelona, Spain; Muskingum Fiber Products Corp., Coshocton, Ohio; National Gypsum Company, Clarence Center, N. Y.; Otsego Falls Paper Mills, Inc., Otsego, Mich.; Papeteries Steinbach & Co. S. A., Malmedy, Belgium; Puerto Rico Pulp and Paper Corporation, San Juan, P. R.; Puget Sound Pulp and Timber Company, Bellingham, Wash.; S. A. des Anciens Ets. Braunstein Fr., Paris, France; Society des Papeteries de Gascogne, Landes, France; John Strange Paper Company, Menasha, Wis.; Tanins Rey, S. A., Paris, France; Tennessee Paper Mills, Chattanooga, Tenn.; Morton C. Tuttle Company, Boston, Mass.; United Paperboard Company, New York, N. Y.; Watervliet Paper Company, Watervliet, Mich.

Companies that have become corporate members since January 1, 1948 include: The Bartgis Bros. Company, Ilchester, Maryland; Fibreboard Products Inc., Antioch, Cal.; Star Paper Mills Ltd., Lancashire, England; Star Paper Mills Ltd., Saharanpur, India.

The following companies became sustaining members in 1947: Art Color Printing Company, Dunellen, N. J.; Brown Instrument Company Div., The Minneapolis-Honeywell Regulator Company, Philadelphia.; The Carborundum Company, Niagara Falls, N. Y.; Casein Co. of America, New York, N. Y.; Industrial Paper & Cordage Company, Pawtucket, R. I.; Kidder Press Company, Inc., New York, N. Y.; Frederick H. Levey Company, Inc., Philadelphia, Pa.; Lukenweld, Inc., Coatesville, Pa.; Moore & White Company, Philadelphia, Pa.; Paper & Industrial Appliances, Inc., New York, N. Y.; Ross Paper Machinery Company, Newark, N. J.; Sprout, Waldron & Company, Inc., Muncy, Pa.; Traylor Engineering & Manufacturing Company, Allentown, Pa.

Since January 1, 1948, the following companies have become sustaining members: Ciba Company, Inc., New York, N. Y.; Kelco Company, Chicago, Ill.

Necrology

In July 1947 the Association sustained the loss of its President, Worthen E. Brawn who died suddenly while enroute to Europe.

Other members of the Association who were lost through death were: Albert Bankus, Crown-Zellerbach Corp.; Willard Barnhart, American Boxboard Company; Edwin F. Burns, International Paper Company; George Carruthers, Interlake Tissue Company; Richard H. Dempsey, Rising Paper Company; George H. Dyer, Oxford Paper Company; W. M. Grohmann, Franklin Research Company; J. B. Hawley, Hawley Products Company; George F. Hardy, George F. Hardy Company; W. Norman Kelly, Weyerhaeuser Timber Company; John A. Kenney, Allied Chemical & Dye Corp.; Tom O'Flynn, Empaques de Carton Titan, S. A.; George H. Pountain, International Paper Company; Clifford Reynolds, Coos Bay Pulp Company; Arthur G. Ready, National Container Corp.; John F. Rhoades, Consultant; N. L. Shamroy, Rust Engineering Company; F. G. Sherbondy, Biggs Boiler Works Company; Bruce Suttle, Herty Foundation Laboratory; Wm. S. Taylor, American Cyanamid Company; John Traquair, Mead Corporation; Leon M. Yoerg, American Writing Paper Company.

Special Reports on Manufacturing Problems

A large portion of the daily routine of the central office consists of handling a very large number of inquiries for technical and other types of information. Many of these are made by personal visits and others by mail. Although most responses can be made relatively quickly some inquiries require advice from a number of members. The responses of the latter are frequently compiled under code in the form of special

reports. Other reports are based on surveys made by the Association's committees and by independent investigation by the central office staff. During 1947 the following reports were issued and several started in 1947 are in process of being completed.

No. 370 Insulation Board Stock Testing
371 Preparation of Halfstock from Cotton Fiber
372 Testing of Cotton Fiber
373 Process Water Used in the Manufacture of Papers Containing Groundwood

EMPLOYMENT

As in 1946 the number of positions open far exceeded the supply of men qualified to fill them. A large portion of this demand was for pulp and paper mill engineers. The tremendous expansion and rehabilitation program of the industry was the principal cause of this demand. The trend toward large units and automatic controls called for exceptionally well qualified engineers.

COOPERATION WITH SOCIETIES

During the past year the Association Technique de l'Industrie Papetiere was organized in France. This organization which is patterned after the Technical Association was organized after a number of French papermakers visited the United States and had an opportunity to investigate the organization and its activities in this Country.

A similar organization was formed by the representatives of the industry in Australia.

Under the leadership of Harold R. Murdock a former officer of the Technical Association, the Technical Association of the Pulp and Paper Industry of Japan was organized in February 1947 in Tokyo. This is the first organization of its kind organized in the Japanese paper industry.

The TAPPI Standards and Data Sheets were translated into the Czech language by R. L. Rys of the Harmanec Paper Mill Ltd. in Slovakia, C. Z.

Cooperation has continued relative to the development of testing standards with the American Standards Association, the American Institute of Mechanical Engineers, the American Chemical Society, and the American Society for Testing Materials.

The Association is participating in the work of the Wood Chemistry Committee of the United Nations Food and Agricultural Organization. In particular the Association is cooperating in the work of the Subcommittee on Nomenclature, Testing and Specifications. On this subcommittee are representatives of the principal pulp and paper technical organizations throughout the world.

In addition, a cooperative arrangement has been established between the Association and the Technical Sections of the Canadian Pulp and Paper Association, and the Papermakers' Association of Great Britain and Ireland wherein the new testing methods developed by each Association is referred to the others for suggestions and criticisms prior to official adoption.

FALL MEETINGS

For a second year the Association followed a policy of holding a number of fall meetings devoted to limited but important interests. Prior to the war it was the practice to hold a general fall meeting.

The first fall meeting was held at Appleton, Wis., on September 3-5 and was sponsored by the Fundamental Research Committee. It was devoted to a consideration of the polysaccharides and lignin. Harry F. Lewis of the Institute of Paper Chemistry was general chairman. About 175 attended.

The second meeting was held at Syracuse, N. Y., on September 25-26, 1947. It was sponsored by the Plastics Committee. E. C. Jahn of the New York State College of Forestry was general chairman. About 100 attended.

The third meeting was held at Asheville, N. C., on October 9-11, 1947. This meeting was sponsored by the Alkaline Pulping and Chemical Products Committee and was held jointly with the Southern and Southeastern Divisions of the Superintendents Association. Visits to the mills of the Champion Paper & Fibre Corporation, Canton, N. C., and the Ecusta Paper Company, Pisgah Forest, N. C., featured this meeting. K. G. Chesley of the Crossett Lumber Company, Crossett, Ark., and W. P. Lawrence of the Champion Paper and Fibre Company were chairmen respectively of the TAPPI sponsoring committees. About 700 attended.

The fourth meeting was held at Alton, Ill., on October 23-24, 1947, and was sponsored by the Fibrous Agricultural Residues Committee. S. I. Aranovsky of the Northern Regional Research Laboratory, Peoria, Ill., was general chairman. The sessions were held in the

A. E. BACHMANN

GEORGE J. BRABENDER

JAMES A. WISE

Members of TAPPI Executive Committee

PULPS SUITABLE FOR EVERY PAPER MAKING REQUIREMENT

MO & DOMSJO A. B.

BLEACHED SULPHITES
White Horse Strong
White Horse Greaseproof
White Horse Special
White Horse Tissue
White Horse Soft

RAYON PULPS
Dissolving & High Alpha
Pulps for Rayon, Plastics
& Specialties

UNBLEACHED SULPHATE
Husum Kraft

BLEACHED SULPHATE
Husum White Kraft
Husum Bleached Hardwood

KORSNAS AKTIEBOLAG

BLEACHED SULPHITE
Roburwite

UNBLEACHED SULPHITES
"Selected" Mitscherlich
"L" Mitscherlich
"Glassine" Mitscherlich

BLEACHED SULPHATES
Vigorwite Kraft, Extra Strong
Extralba Kraft, Extra White
Manila Kraft, Semi-Bleached

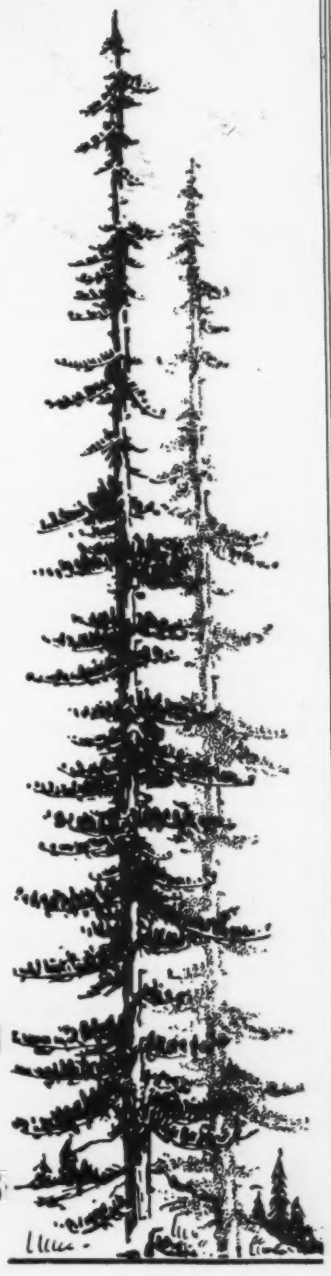
UNBLEACHED SULPHATES
Kraft "US"
Kraft "Z"
Kraft "Standard"

STORVIKS SULFIT AKTIEBOLAG

UNBLEACHED SULPHITE
Storvik "HS" Extra Strong
Mitscherlich

AKTIEBOLAGET ROBERTSFORS

UNBLEACHED SULPHITES
Robertsfors "RI" and "R" Direct
Cook Sulphite



Pagel, Horton & Co., Inc.

347 Madison Avenue, New York 17, N. Y.

ESTABLISHED 1916

K. P. Geohegan

William R. Barber

John A. Hanson

Members of TAPPI Executive Committee

mill of the Alton Box Board Company who was the host to the group. About 125 attended.

The fifth meeting was held at the Bellevue Stratford Hotel, Philadelphia, Pa., on November 3-5, 1947, and was designated as the Second Engineering Conference of the Pulp and Paper Industry. This meeting was sponsored by the Engineering Division and J. W. Hemphill of the Johns-Manville Sales Corporation was general chairman. About 700 attended. The meeting was featured by visits to the plants of the Pusey & Jones Corporation and J. E. Rhoads & Sons in Wilmington, Del., and to the Downingtown Mfg. Company in Downingtown, Pa., the Westinghouse Electric Company and Brown Instrument Company in Philadelphia.

All of the meetings held were very successful and brought together individuals having particular interest in the subjects featured. The total attendance of the five meetings was probably greater than it would have been if a single fall meeting had been held.

Publications

Considerably more than half of the Association's funds are used to finance technical publications for the benefit of the Association members and the pulp, paper and related industries. This phase of the Association work has been marked by rapidly increasing printing costs. The Association's services in this respect have not been materially affected to date very largely because of the considerable growth in membership which has provided more than sufficient funds to meet these costs. In fact, it was possible in 1947 to finance the publication of one monograph and a ten year collective bibliography out of current funds. When these items were budgeted at the beginning of the year it was felt that it would be necessary to draw upon accumulated surplus funds for these extra services.

Technical Association Papers: This annual clothbound volume was ready for the printer several months ago but because of printing plant limitations, which have affected all of the Association's publications it will not be ready for distribution until early 1948. It will again exceed 700 pages in length.

Paper Trade Journal

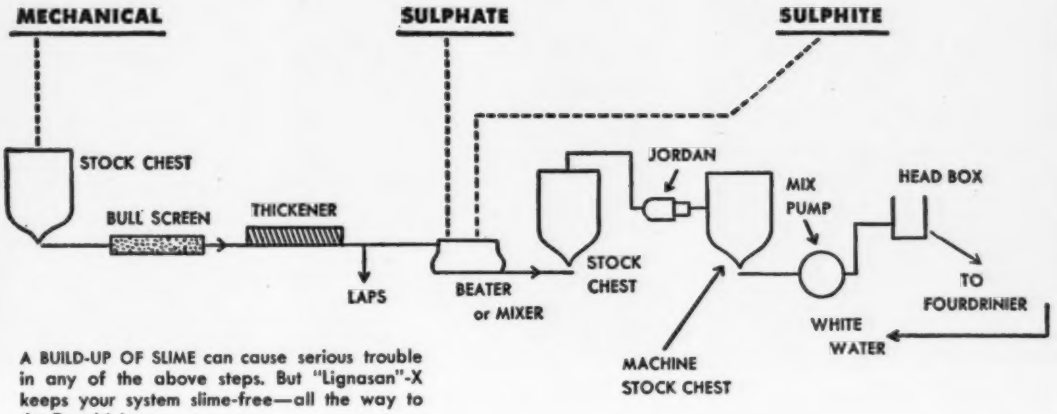
Paper Trade Journal: The papers presented at the national meetings of the Association, the tentative standards and miscellaneous contributed articles were published in the Paper Trade Journal. This arrangement between the Association and the Journal has been in existence since 1921.

Bibliography of Paper Making: During 1947 the Association issued two clothbound bibliographies. One covered all of the technical literature published between 1936 and 1945, and the other covered the liaterature of 1946 plus the U. S. Patents issued in 1945 and 1946. In the bibliographies there now appears a continuous record of nearly every book and article on pulp and paper making published since 1900. The paper industry is the only industry that has such a complete record of its manufacturing progress. All of these bibliographies have been compiled by Clarence J. West of the Institute of Paper Chemistry.

Standards: Twelve standard testing methods were issued in 1947, either as new, revised or advanced status methods. In considering the number of standards issued in any year it should be kept in mind that publication is the final step in the development of a standard. Many standards represent a long period of study, often more than a year. When the need for the establishment of a test is determined one or more individuals may proceed to write it in standard form. This, of course, is done after considerable research has indicated the proper procedure. It is then submitted to an appropriate committee for vote. This committee may immediately approve it or may require a round-robin series of tests to establish its reproducibility. When three-quarters of the members approve the method it is submitted to the general chairman of the appropriate devision for review and approval. He then passes it along to the Standards Committee for final consideration. If this committee approves the method it becomes a tentative standard. If the method is obviously not the type that could be recognized as a standard it may go through the same procedure but upon approval by a majority of the initiating committee it may become a suggested method. After the lapse of one year the Standards Committee and the initiating committee may refer the method to the voting members of the Association for approval as an official standard method.

TAPPI Data Sheets: A number of data sheets were issued in 1947. These featured a complete listing of dyes used in the paper industry giving their international index numbers. The index numbers serve

Where is slime control your biggest problem?



A BUILD-UP OF SLIME can cause serious trouble in any of the above steps. But "Lignasan"-X keeps your system slime-free—all the way to the Fourdrinier.

In all types of paper and paper board mills...

use LIGNASAN®-X

BACTERICIDE AND FUNGICIDE

for a Clean System

"LIGNASAN"-X helps to keep your plant in continuous operation. It minimizes shutdowns for washing the system by eliminating slime-clogged pipes, screens, chests and headboxes . . . keeps the system clean, all the way to the paper machine.

"Lignasan"-X helps prevent smears, holes, weak spots and breaks in the sheet caused by slime. And it averts such production bottlenecks as sheets sticking to the press rolls.

"Lignasan"-X is also an effective protectant for wet laps in storage, coating compositions and papermakers' alum. It is ideal for preserving slush pulps.

Low Cost . . . Quick Acting

"Lignasan"-X is inexpensive. And in most cases, it takes only a few ounces of "Lignasan"-X per ton of fiber to do the job.

This improved bactericide and fungicide is now water soluble for quick action.

In ground wood mills, it can be added to the slush pulp as it leaves the grinders. For cooked pulps, it is added most effectively after the pulp has been washed and thickened.

Du Pont will be glad to send you full details on the latest and most efficient methods of using "Lignasan"-X. Address E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

DU PONT LIGNASAN®-X

Bactericide and Fungicide

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT
REG. U.S. PAT. OFF.

RALPH A. WILKINS

J. W. HEMPHILL

JAMES D'A. CLARK

Members of TAPPI Executive Committee

somewhat as a common denomination to indicate the basic similarity of dyes made by different manufacturers under various trade names.

Members are urged to submit material or ideas for future data sheets. Suitable material would consist of engineering or operating data that would be helpful to other members.

TAPPI BULLETIN: The TAPPI Bulletin was issued on approximately a monthly basis throughout the year. Although this publication was started to coordinate information concerning new wartime paper products, it has continued partly as an Association house organ to announce important events and also to provide members having a general interest in technical matters with well prepared, easily understood summaries and interpretations of technical developments. Generally the published material is information of value not commonly found in the industry's trade journals.

MONOGRAPHS: One monograph "Pulpwood Stands, Procurement, and Utilization" was issued. The material contained in this monograph was the group of papers and their discussions presented at the Detroit, Mich., meeting of the Fundamental Research Committee in the fall of 1946. There was a definite need for such a publication and its reception was rather enthusiastic.

LOCAL SECTIONS

No new sections received charters in 1947. All of the sections had a successful year and maintained regular meeting schedules, some on a monthly basis from September to June.

Chairmen of local sections elected during the year were *Pacific* — Joseph L. McCarthy, University of Washington; *Lake States*—Clarence J. West, Jr., Kimberly-Clark Corporation; *Delaware Valley*—John Macadam, National Vulcanized Fibre Company; *Kalamazoo Valley*—Leon H. Mimms, Kalamazoo Paper Company; *New England*—C. H. Child, Merrimac Paper Company; *Ohio*—D. M. Yost, Sorg Paper Company; *Empire State* — Martin Jaffe, National Paper Products Company; *Maine-New Hampshire*—E. L. Lamb, Oxford Paper Company; *Chicago*—J. L. Kubica, Container Corporation of America. The Papermakers and Associates of California (unaffiliated) William G. Hartford, U. S. Gypsum Company.

DIVISIONS AND COMMITTEES

Seventy-three committees and subcommittees in seven major divisions carried on the professional work of the Association on a national scale. Most of the committees were quite active and carried on a constructive program for the benefit of the pulp and paper and related industries.

A contributing feature of committee work has been the planning of important meetings for the discussion of current and fundamental problems. Unusually fine support of these meetings has been given by the companies in the industry. In addition to the annual meeting which is literally a group of conventions serving most of the industry's needs there were five fall meetings sponsored by a few committees. These ranged in attendance from 100 to 700 and dealt intensively with the problems of limited branches of the industry.

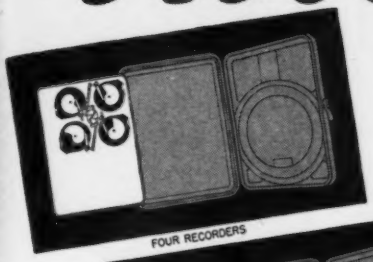
Personnel changes among the division and committee chairmen were as follows:

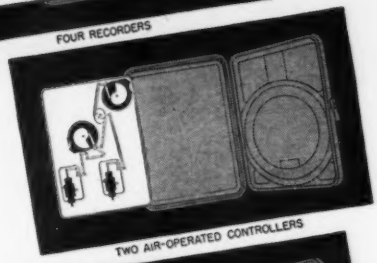
Engineering Division: J. W. Hemphill, Johns-Manville Sales Corporation succeeded E. F. Burns (deceased) International Paper Company, as general chairman. This division sponsored the Second Engineering Conference of the Pulp and Paper Industry at Philadelphia. There has been a substantial increase in the membership of the Association on the part of plant engineers because of this important activity. *Steam and Power Committee:* J. E. A. Warner, Robert Gair Company continued as chairman; *Materials Handling:* George R. Wadleigh, consulting engineer; Drying and Ventilating: A. E. Montgomery, J. O. Ross Engineering Corporation; *Engineering Researchs* W. G. MacNaughton, Newsprint Service Bureau found it necessary to resign as chairman and has been succeeded by P. H. Goldsmith, Pusey & Jones Corporation; *Mill Design and Economic Aspects:* Milton Jacobs, Chas. T. Main, Inc.; *Mill Maintenance and Materials:* G. H. Pringle, Mead Corporation.

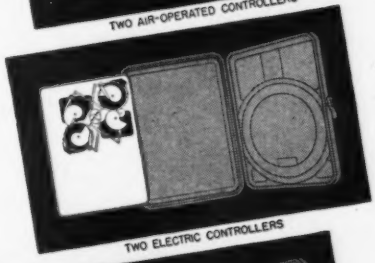
Industrial Division: Werner Kaufmann, Kupfer Bros. Company succeeded G. J. Brabender, Marathon Corporation as general chairman. The present committee chairmen are: *Nonfibrous Raw Materials:* E. N. Poor, American Cyanamid Company; *Vocational Training:* B. E. Lauer, University of Colorado; *Fibrous Raw Materials:* This committee was discontinued following the death of its chairman, John Traquair, Mead Corporation. Many of the functions of this committee have been taken over by other committees; *Mill Instrument*

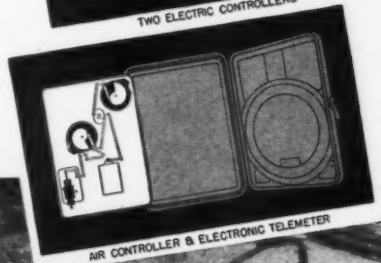
these and 100,000 more

FROM 4 CIRCUITS AND 8 BASIC PARTS


FOUR RECORDERS


TWO AIR-OPERATED CONTROLLERS


TWO ELECTRIC CONTROLLERS


AIR CONTROLLER & ELECTRONIC TELEMETER

What's your control problem? Flow—temperature—level? Are you using solids—liquids—gases?

No matter what you process, four basic circuits and eight basic component parts will give you more than 100,000 different electronic measuring and controlling combinations. That's how Bailey has simplified controls for processing industries.

The four arrangements illustrated show how easily Bailey interchangeable parts can be used. It's no longer necessary to carry a huge stock of replacement parts for emergency control installations. When you standardize on Bailey controls you are always ready to meet changing conditions within your plant.

And with Bailey simplified controls, your maintenance costs will be less. Maintenance men quickly become familiar with Bailey controls and spend less time on maintenance and installation.

To see for yourself how you can profit with Bailey controls, write for a copy of our bulletin No. 17.

BAILEY METER CO.
1056 Ivanhoe Road • Cleveland, Ohio
BAILEY METER CO. LIMITED, MONTREAL
Controls for Processing Industries
PRESSURE • FLOW • LEVEL
GAS ANALYSIS • TEMPERATURE • RATIO

P-17

4 + 8 works here at the Barberton Plant of Pittsburgh Plate Glass Company, Columbia Chemical Division

A. C. Hill

Werner Kaufmann

J. D. Davis

Members of TAPPI Executive Committee

Control: R. W. Porter, Chemical Engineering, The McGraw Hill Company; *Water:* Lewis B. Miller, University of Cincinnati; *Fibrous Agricultural Residues:* S. I. Aronovsky, Northern Regional Research Laboratory. (F.A.R. Subcommittees: *Procurement, Storage and Preservation:* H. M. Blandin, Central Fibre Products Company; *Raw Materials Classification:* Dr. Aronovsky; *Pulping:* B. D. Stahl, Terre Haute Paper Company; *Board and Paper Manufacture:* M. F. Knack, River Raisin Paper Company; and *Testing:* N. F. Wilson, Alton Boxboard Company). This committee sponsored a fall convention at Alton, Ill.

Converting and Consuming Division: Ralph A. Wilkins, Bird & Son succeeded Pierre Drewson, consulting engineer as general chairman. *Containers:* W. B. Lincoln, Jr. Inland Container Corporation; *Graphic Arts:* R. H. Simmons, Government Printing Office; *Coating:* Werner Kaufmann, Kupfer Bros. Company. (The subcommittee chairmen are as follows: *Adhesives:* Miss R. M. Cobb, Lowe Paper Company; *Mechanical Equipment:* F. W. Egan, consulting Engineer; *Pigments:* W. R. Willets, Titanium Pigment Company; *Raw Stock:* W. A. Kirkpatrick, Allied Paper Mills; *Testing Procedures:* Miss Lois Hans, Hercules Powder Company; *Plastic Coatings:* S. S. Gutkin, Falk and Company; *Gummed Paper:* F. W. Farrell, McLaurin Jones Company; and *Waxes:* J. D. Clark, D. L. Ward Company). This committee is preparing a number of monographs on various phases of paper coating.

Research Development Division: G. J. Brabender, Marathon Corporation succeeded F. W. Brainerd, Scott Paper Company as general chairman. *Bibliography:* C. J. West, Institute of Paper Chemistry. (This was formerly the Abstracts and Bibliography Committee); *Fundamental Research:* Harry F. Lewis, Institute of Paper Chemistry. (This committee conducted a symposium on polysaccharides and lignin during the fall at Appleton, Wis.); *Patents:* C. J. Rivise, Caeser and Rivise; *Statistics:* T. A. Pascoe, Nekoosa-Edwards Paper Company (This was formerly the Analysis of Test Data Committee); *Microbiological Control Methods:* J. W. Appling, Buckman Laboratories succeeded R. H. Torrey of the Riegel Paper Corporation. (This committee was formerly known as the Bacterial Control Methods Committee and functioned jointly with the American Paper and Pulp Association); *Chemical Engineering:* Roy P. Whitney, Institute of Paper Chemistry; *Wet Strength:* K. M. Britt, Scott Paper Company. (This was formerly a subcommittee of the Plastics Committee); *Plastics:* E. C. Jahn, New York College of Forestry. (The subcommittee of this committee are: *Resin Analysis:* T. A. Howells, Institute of Paper Chemistry; *Resins and Plastics:* Herman Mark, Polytechnic Institute of Brooklyn; *Resins for Paper Converting* (formerly Coating, Laminating, and Saturating): R. H. Mosher, Marvellum Company, and *Fabrications* N. R. Yorke, Panelyte Div. St. Regis Paper Company).

Pulp Manufacture Division: John A. Hanson, Badger Paper Mills succeeded W. F. Gillespie, Gaylord Container Corporation who became President of the Association upon the death of W. E. Brawn; *Acid Pulpings* G. H. McGregor, Minnesota & Ontario Paper Company; *Alkaline Pulping:* K. G. Chesley, Crossett Lumber Company; (This committee together with the Chemical Products Committee sponsored a fall convention at Asheville, N. C.); *Mechanical Pulping:* R. M. Drummond, International Paper Company; *Paper Deinking:* Frederic C. Clark, consulting engineer; *Pulp Purification:* W. D. Harrison, Riegel Paper Corporation; *Chemical Products:* W. P. Lawrence succeeded R. H. Stephens, National Container Corporation as chairman; *Structural Fibrous Materials:* J. F. Campbell, Flintkote Company. (The two subcommittees of this committee are: *Raw Materials Testings* G. C. Kimble, Minnesota & Ontario Paper Company; and *Finished Products Testing:* G. B. Brown, Johns-Manville Research Laboratory).

Paper Manufactures J. D. Davis, Dill & Collins, Inc., succeeded J. A. Wise, Kalamazoo Paper Company as general chairman; *Preparation of Papermaking Materials:* P. P. Gooding, Strathmore Paper Company; (The subcommittees of this committee are: *Cotton Cooking and Bleaching:* F. S. Klein, Byron Weston Company; *Fillers Monograph:* R. J. Porter, Fitchburg Paper Company; *Stuff Preparation and Sheet Formation:* L. A. Moss, Whiting-Plover Paper Company; *Significance of Sizing Tests:* R. G. Mispley, Crown Zellerbach Corporation; *Alum Strength:* John Bainbridge, Jr., Monsanto Chemical Company); *Papermaking:* A. E. Bachmann, Missisquoi Corporation. (This committee has been discontinued and succeeded by its

ONE *recognized standard*

THE COTTRELL PROCESS OF ELECTRICAL PRECIPITATION

FOR GAS CLEANING, smoke abatement and removal of dust, fume, tar and other suspended matter from gas, there has been one universally accepted process for more than thirty years. In answer to your special problem, a Cottrell installation incorporating this rich experience in research, development and worldwide operation means the complete fulfillment of your requirements.

RESEARCH CORPORATION

NEW YORK 17: 405 LEXINGTON AVENUE
CHICAGO 3: 122 SO. MICHIGAN AVENUE

two subcommittees which have been advanced to full committee status. The new committees are: *Papermaking (Fourdrinier):* B. L. Kassing, New York State College of Forestry, and *Papermaking (Cylinder):* O. E. S. Hedbring, United Board and Carton Corporation).

Testing Division: J. d'A. Clark, consulting engineer, general chairman. *Fibrous Materials Testing:* E. R. Schafer, Forest Products Laboratory; *Non-Fibrous Materials Testing:* W. F. Hathaway, Kalamazoo Vegetable Parchment Company; *Pulp Testing:* L. V. Forman, Institute of Paper Chemistry; *Optical Properties:* A. H. Croup, Hammermill Paper Company; *Container Testing:* Don L. Quinn, consultant; *Packaging Materials Testing:* G. R. Sears, Institute of Paper Chemistry; *Paper Testing:* B. W. Scribner, Bureau of Standards; *(Erasing Properties Subcommittee:* P. W. Codwise, Beaver Wood Fibre Company); *Microscopy:* Thomas Fyfe, Eastman Kodak Company; *Chemical Methods:* Milton Fillius, Eastman Kodak Company succeeded John C. Tongren, Hammermill Paper Company as chairman; *(Alpha, Beta, and Gamma Cellulose Subcommittee:* A. S. O'Brien, Eastman Kodak Company; *Disperse Viscosity Subcommittee:* Peter Van Wyck, Hercules Powder Company).

Special Committees: Research Appropriations Committee: John L. Parsons, Hollingsworth & Whitney Company, Chairman; *Standards Committee:* Roger C. Griffin, Chairman; *Joint Textbook Committee:* George E. Williamson, Chairman.

Resinography in the Paper Industry

By T. G. Rochow[1], G. E. Coven[1], and Evelyn G. Daris[1],

Abstract

A brief description with numerous illustrations of the microscopical methods for resinographic investigation is presented

The industrial importance of fabricated resins has led to the study of their general structure. Members of the pulp and paper industries are especially interested in vegetable fillers which are or can be used in these resins. Such fillers may be present in natural or synthetic forms as individual particles or in highly aggregated states. In whatever mode of occurrence, there are two general classes of information which may be obtained from a study of the structure of a filled, fabricated resin: 1. The functional aspects of the filler, and 2. The identity of the filler.

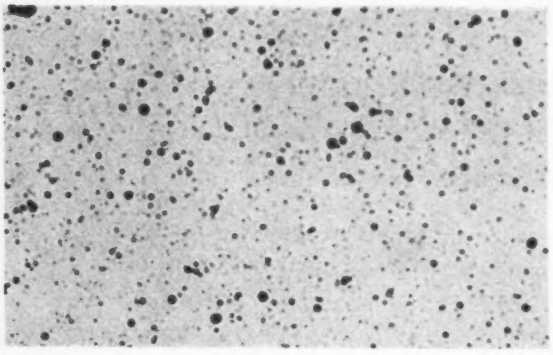


FIG. 1

Wood pitch, proposed for transformer insulation, shown after heating and squeezing into a thin film and photographed by axial transmitted light. The gray background is a continuous, resinous phase. The round, dark-gray particles are a discontinuous phase, which was correlated with poor insulation. (410 X)

The functional aspects of the filler include size, shape, and distribution of filler-particles, bond between filler and resin, extent of resin-impregnation of filler, visibility and light-scattering of the filler, relation between filler and imperfections if any, and so forth. A study of these functional aspects usually requires that the filler be studied *in situ* in a macroscopical piece of the resin as received, whereas for identification, the filler may possibly be *isolated* from the resin. For almost all thermoplastic resins, but only a few thermoreacted ones, a preferential solvent may be found to leave the filler in a state suitable for identification by the present methods for pulps and papers. These methods are familiar to the members of TAPPI and will not be discussed here. Instead, we shall concern ourselves with those fabricated resins from which the filler cannot or should not be preferentially removed.

The general study of the structure of resins, including the identity of its phases, is conveniently called *resinography*, to denote the graphic study of resins. Resinography is concerned with structure, both external and internal. The pertinent structure may be within or among the various physical chemical phases. Such studies involve all available, suitable methods, such as analytical chemistry, microscopy, spectroscopy, diffraction, and physical testing. In general, however, microscopy is the principal method of resinographic investigations. Microscopy utilizes various image-forming radiations, including visible and ultraviolet light and an electron beam.

Fillers possibly may be studied *in situ* in a resin by

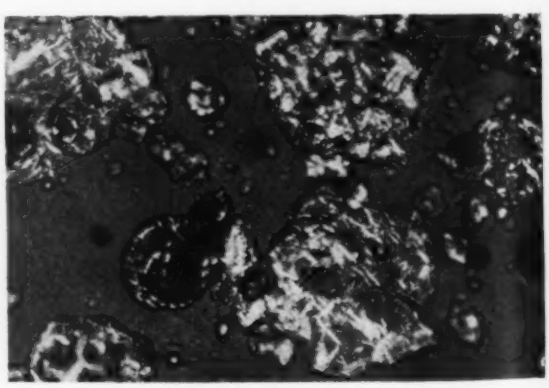


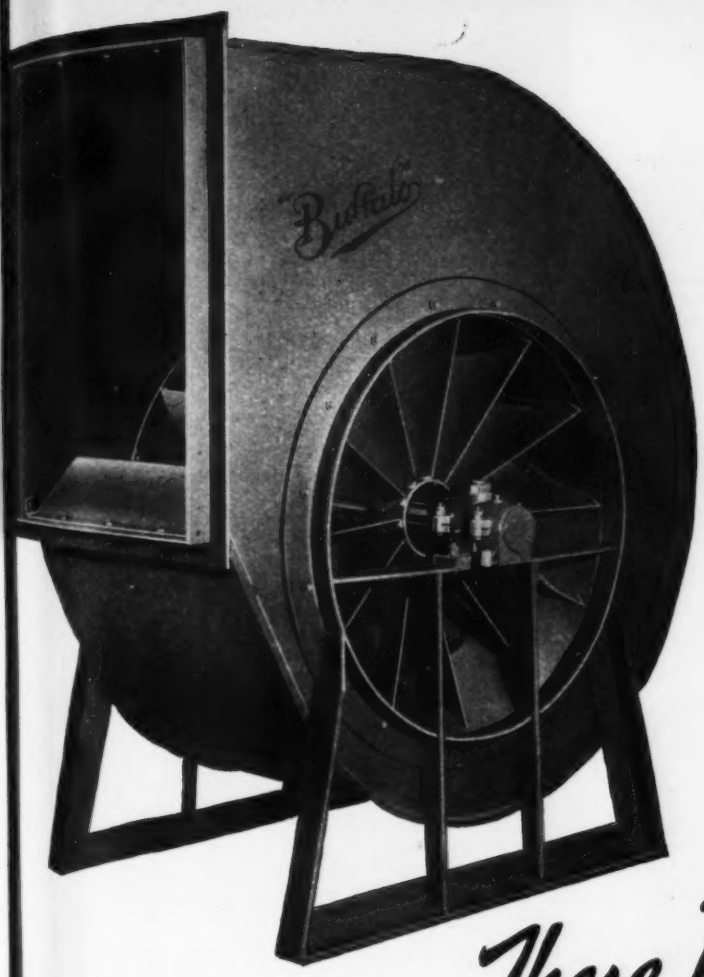
FIG. 2

Spray-dried resin adhesive, mounted in Nujol and photographed, as received, between partly crossed polarizers. The central particle shows to advantage the included shives (white) from the wood flour filler. The black disks represent air bubbles, some of which have already escaped from the spray-dried particles. (110 X)

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

[1] Microscopists, Research Laboratories, American Cyanamid Co., Stamford, Conn.

AIR EQUIPMENT TO HELP YOUR BUSINESS



FANS by "Buffalo"

These "LL" Features Mean

BETTER AIR SERVICE

- Wide, double-curved blades with full open tips handle more air at slower speeds, less noise and less cost.
- Improved scroll contour also aids quiet, efficient operation.
- Stationary inlet vanes reduce air turbulence — aid higher delivery, especially when inlet obstructions disturb air entry.
- Husky, oil-tight, dust-proof bearings — self-aligning.
- "Limit-Load" characteristic prevents overloading motor.
- Sizes and arrangements to fit your particular need.

WHAT AIR SERVICE DO YOU NEED? Write us for recommendations — at no obligation.

BUFFALO FORGE COMPANY

159 Mortimer St. Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

EQUIPMENT FOR

- ★ VENTILATING
- ★ HEATING
- ★ COMFORT COOLING
- ★ PROCESS COOLING
- ★ AIR TEMPERING
- ★ AIR WASHING
- ★ EXHAUSTING
- ★ BLOWING
- ★ FORCED DRAFT
- ★ INDUCED DRAFT
- ★ PRESSURE BLOWING
- ★ CLEANING
- ★ DRYING

CUTTING AIR COSTS IN EVERY BRANCH OF INDUSTRY

either transmitted or reflected radiation or both. By transmitted radiation, a resin may be examined under the optical microscope in small particles or in thin section, analogous to the methods of petrography. Generally, however, it is more convenient or better to use polished sections and reflected light, analogous to the methods of metallography and mineralography. There are advantages and limitations to both the transmitted and reflected light methods and both should be used to advantage in the solution of the problem on hand. In a discussion of methods of preparation for microscopical observation, it is convenient to separate optical microscopy from electron microscopy, because there are basic differences between the two types of instruments. For example, there is yet no satisfactory method for forming an image by the reflection of electrons from an object. Furthermore, a "thin" section for examination by means of an optical microscope by transmitted light is much too thick for use of the electron microscope. Therefore, replicas sufficiently thin are prepared from a pertinent surface. For the optical microscope, however, replicas generally are not required or even desired. Rather than separate methods of preparation and examination from examples of application, typical problems and the methods of attack which the authors consider to be most advantageous are presented in brief. For more details of the methods than can be discussed herein, the reader is referred to a more extensive discussion of resinography *(1)*.

Transmitted Light

Particles

The microscopial examination of particles by transmitted radiation is one of the simplest methods of resinography. Unfortunately, a vegetable-filled, thermoreacted resin is rarely encountered in particulate form and disintegrating a macroscopic piece of such a resin will destroy the gross structures of the resin. Furthermore, the high powers of the optical microscope require particles around 150μ or less in diameter in order to satisfy the requirements of depth of field and working distance. Moreover, the electron microscope requires particles about 10μ in diameter to allow the passage of sufficient electrons to form an image. There are, however, a few types of resins which are fabricated in particles within the size-limits of the optical microscopes. There are, of course, many more examples of resins in intermediate stages of fabrication which are particulate and of sufficient interest to the pulp industries to mention a few samples.

Emulsions. An unfilled resin often contains particles of another phase and sometimes their presence is unsuspected. For example, tiny particles were found in a wood pitch, proposed for transformer insulation, as shown in Fig. 1. Moreover, it was found among several samples that the insulation value increased with decrease in the proportion of the particular phase.

Particles of Resin Plus Filler. Figure 2 shows the appearance of spray-dried particles of a resin-adhesive containing wood flour as filler. The roughly rounded shapes of particles, frequently including air bubbles (black), are typical of spray-dried material. The shives and fibers of the wood flour are manifested as elongated white areas, because partially crossed polarizers were employed. Details of structure of the wood-particles are missing, however, and this is a limitation of the method employing transmitted-polarized light.

The microscopical examination of paper mill deposits and trouble-forming particles generally produces some information which is useful in the solution of the problem. The low-power photograph (Fig. 3) of a residue

FIG. 3
Stratified residue from paper machine stock chest, by oblique, reflected light. Photographs show alternate strata of paper fibers and natural "pitch." (9 X)

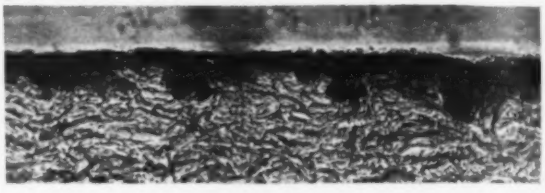


FIG. 4
Coated paper, in microtomed, thin section, as shown by axial, transmitted light. The upper, dark layer represents the pigmented casein coating. (270 X)

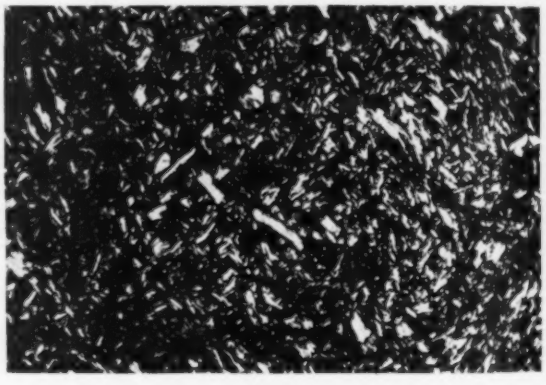


FIG. 5
α-flock cellulose fibers in a resin, as shown by grinding to a thin section and photographing between crossed polarizers by axial, transmitted light. (55 X)

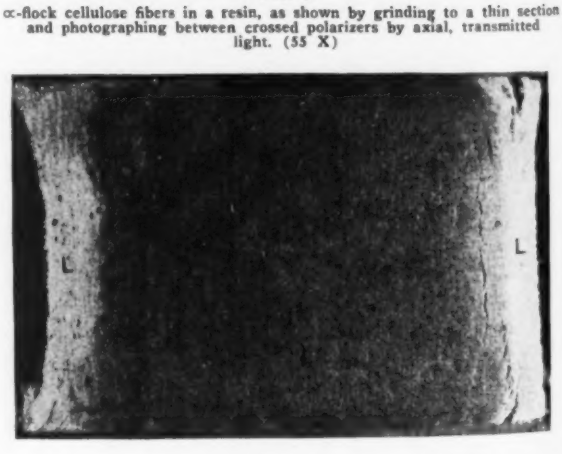
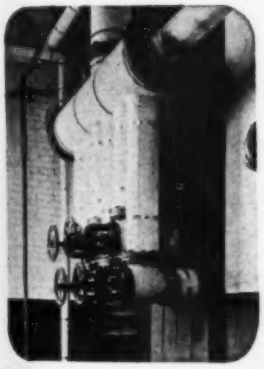


FIG. 6
Cross section of laminated paper, with the external layers (L) impregnated wtih sulphur. The specimen was simply cut across, abraded on No. 220 and No. 400 silicon carbide paper, and photographed by oblique, reflected light. (1½ X)

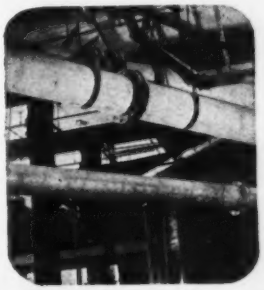
FROM J-M ASBESTOS

..these 6 products to reduce costs, increase production and improve equipment performance.

ROTPROOF ROOFS. A unique combination of roofing and insulating materials bonded to form a deck and roof construction that stops condensation and roof-drip in beater and machine rooms. Protects products and equipment from condensate damage.



INSULATIONS. Any insulation will save money . . . but only the right insulation correctly applied will save the most money for the longest period of time. Johns-Manville offers a complete line of the most efficient and economical insulations for boilers, steam piping, digesters and other heated equipment.



TRANSITE PIPE. An asbestos-cement pipe that has proved its value for white water lines, stock lines, washed pulp lines, and service water lines. It is a low friction pipe that saves power and is free from metallic oxides. Its fibrous nature provides excellent resistance to shock loading.

TRANSITE MACHINE HOODS. Fabricated from Transite Asbestos-Cement sheets. These hoods increase machine capacity and drying efficiency . . . improve paper quality, cut drying costs. Strong, and fireproof . . . made to last.

PACKINGS & GASKETS. J-M's complete line of non-graphited packings and gaskets are designed especially for use against the alkaline, acid, and neutral liquors encountered in pulp and paper making. They reduce replacements, conserve power and help increase production.

FRICTION MATERIALS. For paper mill clutches and tension brakes on paper machine drives, calenders, rewinds and other converting equipment, J-M Brake Blocks and Linings give outstanding durability and controlled performance.

Get complete information on J-M products for the paper industry by writing to Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville PRODUCTS FOR THE PAPER INDUSTRY

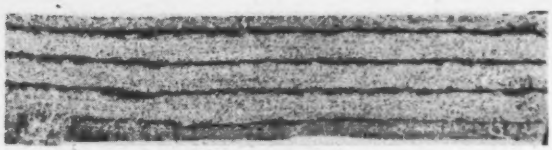


FIG. 7

Laminated paper board from V-1 shipping boxes, as cut across with a razor blade and photographed by oblique, reflected light. *Gray:* Paper laminae. *Black:* Adhesive, stained with methylene blue. (3 X)

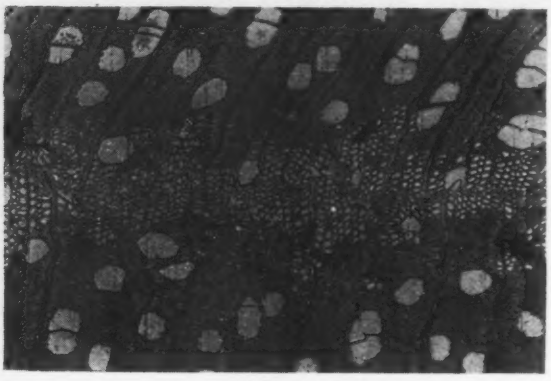


FIG. 8

Two plies of birch wood veneer (top and bottom) joined (center) with a synthetic resin. The laminate is shown in polished cross section by vertically reflected light. Near the joint the tubes are filled with resin and therefore of almost normal size. Outside the joint-area, the tracheids, etc., are compressed to thin ovals in cross section and the rays are compressed to zig-zagging lines. (55 X)

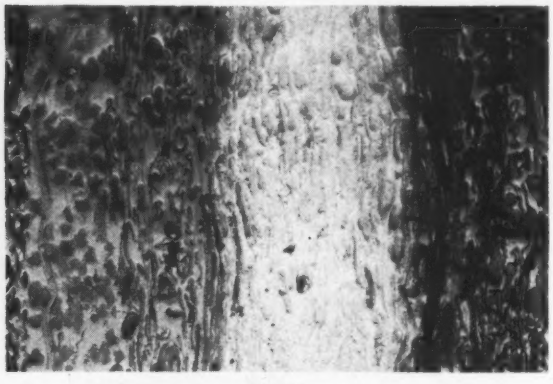


FIG. 9

Polished cross section of laminated, resin-impregnated paper photographed by slightly oblique reflected light. From left to right the layers are: (1) overlay, filled with viscose fibers; (2) design on sulphited paper; (3) white barrier layer of impregnated paper; (4) dark-colored phenolic resin-impregnated core. (135 X)

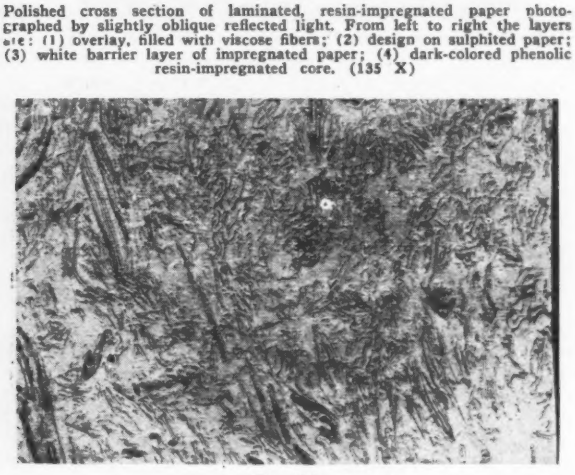


FIG. 10

Wood flour (Finland) in a resin, shown in polished section by slightly oblique, reflected light. Notice that the fibers are straight in lengthwise section and that some cross sections occur in groups. (135 X)

from a paper machine stock chest shows that the particles were stratified in cross-section. These strata were identified at higher powers as alternate layers of paper fibers (white) and "pitch" (black).

THIN SECTIONS

The internal structure of a fabricated resin may be examined with transmitted light provided that a cross section can be made sufficiently thin. In the case of a thin flexible material like paper, such a thin section may be made by means of a microtome, particularly the Hardy type*. Many fabricated resins like laminates, impregnates, castings, and moldings are usually too hard for ordinary microtomes. Such samples are best made into thin sections by the grinding method commonly used by petrographers. This method is relatively crude, however, since such sections are usually made only 30μ thin and are finished with relatively coarse abrasives.

Figure 4 shows a thin section of a paper coated with a pigmented casein preparation.

* The Hardy type of microtome is manufactured by the Gosnell Manufacturing Co., Washington, D. C.

Figure 5 shows in thin section** a piece of molded, thermoreacted resin. The presence of purified cellulose fibers and their distribution are clearly shown, but insufficient morphology is revealed for purposes of identifying even the major class of their natural origin.

** Ground thin sections of the harder types of resins are prepared commercially by George Rev, Department of Geology, Columbia, New York, New York; W. H. Tomlinson, 260 Rolling Road, Springfield, Pa.

Reflected Light

CRUDE CROSS SECTIONS

The use of *oblique reflected light* at low magnifications on roughly prepared cross sections often reveals much pertinent information regarding the structure of a sample. Figure 6 illustrates a good example of this. The sample was constructed of laminated paper in the form of a tube for use as a core for rolling paper. The laminate was cut with a hack saw and subsequently abraded on a relatively coarse abrasive paper. As shown in Fig. 6 at 1½X, the impregnated layers were relatively shallow. At higher powers, yellow crystals were observed in the impregnated layers. These crystals were readily removed and identified microscopically as sulphur.

Figure 7 is a crude cross section of V-1 shipping boxes. The resinographic examination of the laminated paper board revealed the number and relative thickness of the laminae. It also revealed the presence of urea-formaldehyde resin-adhesive and the absence of pitch-layers.

POLISHED CROSS SECTIONS

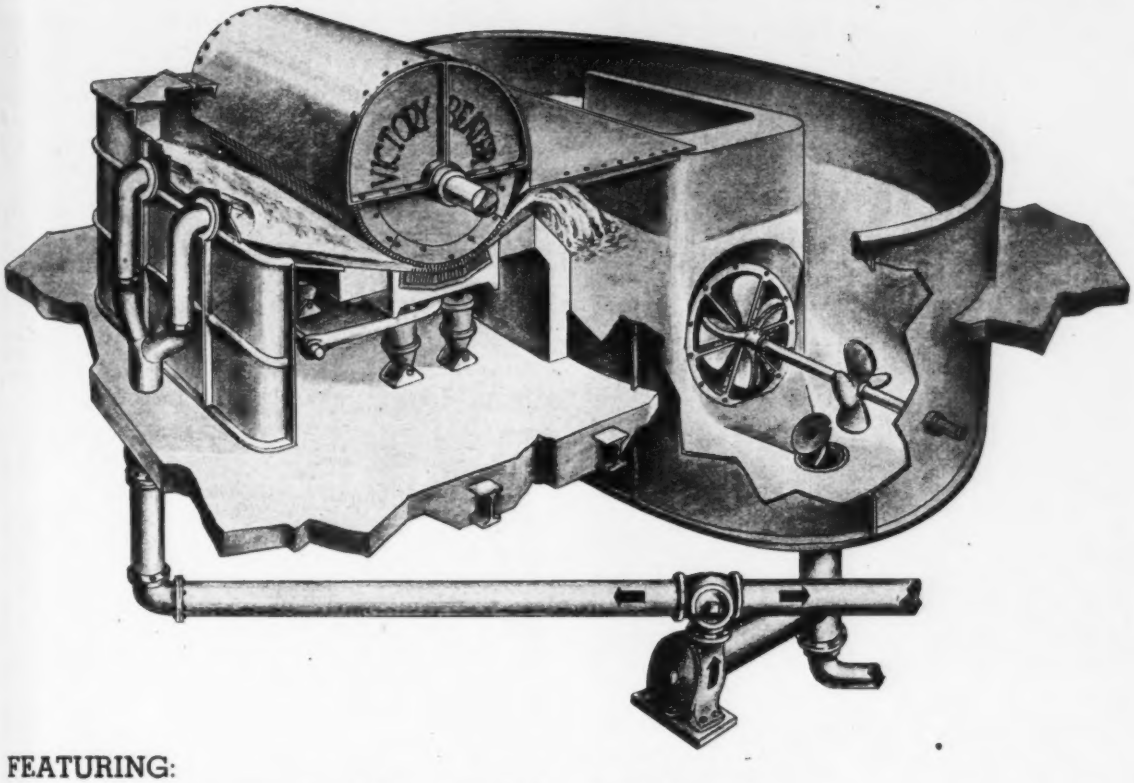
The revelation of fine structure, particularly that necessary to identify the fibers or to ascertain the extent of their impregnation, requires a polish on the cross-section. This is not difficult or time-consuming, however. Vegetable-filled resins are soft, compared with metals and minerals. Such resins are easily cut with steel saws, quickly abraded with various grades of abrasive paper*, and easily polished on a woolen cloth lap charged with fine magnesia. The slight relief which is obtained with cloth laps is generally desirable.

The use of reflected light may seem to be illogical considering the poor reflectivity of resins and vegetable fillers. By increasing the intensity of illumination to

* Such as Nos. 220 and 400 silicon carbide paper (Carborundum Co., Niagara Falls, New York; Norton Co., Worcester, Mass.) and Nos. 0, 3/0, and 4/0 emery paper (Behr-Manning Division, Norton Co., Troy, New York).

THE NOBLE & WOOD - - -

VICTORY BEATER



FEATURING:

CONTROLLED FLOW

This new VICTORY BEATER is based on the principle of *controlled flow*. It's definitely new in design and construction. The beater roll has been completely divorced from the tub. The roll is mounted separately on roller bearings in a fixed position, and performs only one function . . . . that of fibre treatment. The hydraulically operated, multiple bedplate exerts a constantly uniform pressure against the roll at exactly the degree desired for any particular type of fibre being treated.

The whole combination of advantages found in the VICTORY BEATER will amaze you — operating flexibility, shorter beating cycle, increased production, power savings, and many others.

With present day production costs it is imperative that you have the most efficient stock preparation equipment . . . . and that's the VICTORY BEATER.

Write today for your copy of folder PTJ-248.

THE NOBLE & WOOD MACHINE CO.

PULP AND PAPER MILL MACHINERY

HOOSICK FALLS, NEW YORK, U. S. A.

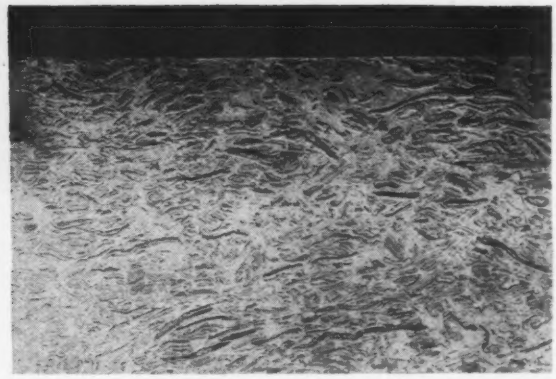


FIG. 11

α-flock as it appears in a polished section by almost vertical, reflected light. The fibers appear wavy in lengthwise section because the chemical preparation has rendered them flexible. In cross section, the thin walled cells appear to be oval because they are collapsed. At least some of the thick-walled cells, however, are rectangular in cross section. (135 X)

FIG. 12

A paper and resin laminate shown in a polished cross section by almost vertical, reflected light. (135 X)

overcome the poor reflectivity, a useful difference in reflectivity between resin and filler is generally observed. Rendering the illuminating beam *slightly oblique*, but still *"bright field,"* i.e., within the angular aperture of the objective, will produce helpful shadows in the relief structures. Obliquities of the illuminating beam greater than the angular aperture of the objective ("dark field") is generally useless due to the scattering of non-image-forming light into the objective.

Figure 8 is a photomicrograph taken by bright field, reflected light of a polished section of a birch wood veneer, including a joint made with resin adhesive. The figure resembles, in appearance, a "thin" cross section taken by transmitted light, but the structures are more sharply defined because the reflection- image is formed of a very much thinner section of wood.

Figure 9 shows the resinographic appearance of a cured laminate of four layers of resin-impregnated paper, in polished cross-section. The photomicrograph at 135X shows how many layers there are, the shapes and distribution of the fibers and some morphological differences among the types of fillers.

Figure 10, shows the resinographic appearance of wood flour in a thermoreacted resin. The edge of the molded surface is on the left. It is a straight line, representing a smooth surface. The wood particles are slightly finer and less populous near the molded surface. Otherwise, the distribution of fibers is uniform. There is, however, a tendency for the large shives to be oriented roughly parallel to the edge of the molded surface. The fibers are straight (stiff) and generally occur in bundles. These are characteristics of ground wood fillers compared with chemically prepared pulps, such as the α-flock shown in Fig. 11. In this photomicrograph, the fibers are single and wavy (flexible). The thin-walled cells are oval because they have collapsed. The thicker walled cells are, however, rectangular in cross section.

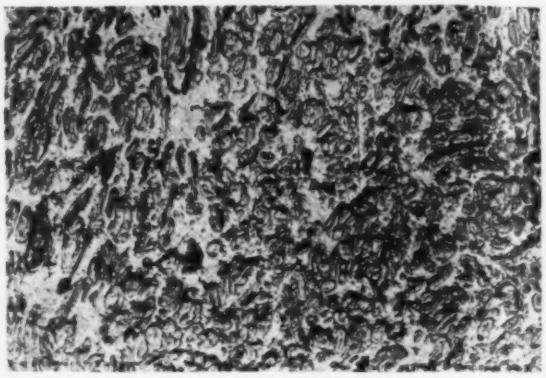


FIG. 13

Cotton filler in a resin in a polished section, by almost vertical, reflected light. Most of the fibers are shown in cross section and they appear as ovals, commas, and circles. Before dehydration they were cylindrical tubes. (135 X)

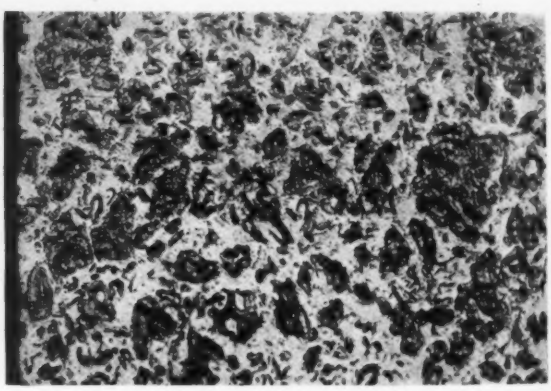


FIG. 14

Walnut shell flour in a resin as it appears in polished section by almost vertical, reflected light. Note the roughly polygonal to rounded shapes which are knurled or laminated or both. The left-hand edge represents the edge of the molded face. (135 X)

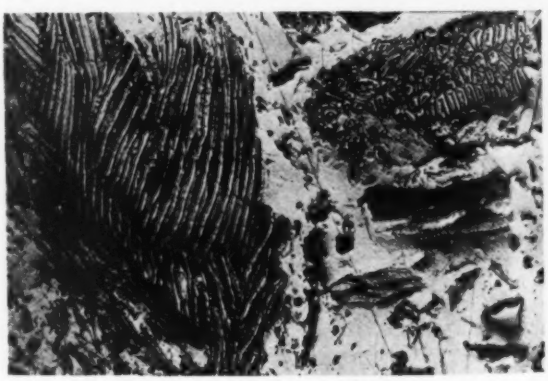
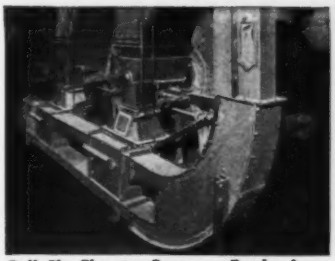


FIG. 15

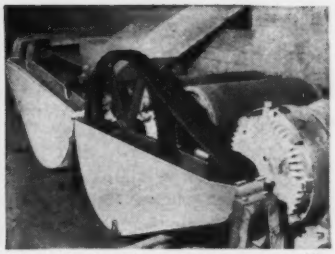
Peanut shells, coarsely ground and mounted in a resin. In this polished section, by almost vertical, reflected light, the shell fragments appear as plates of short, interlocked bundles of fibers, in longitudinal and transverse sections. (135 X)

"A COMPLETE SERVICE"
LINK-BELT
CONVEYORS, MATERIALS HANDLING, PREPARATION EQUIPMENT AND POWER TRANSMISSION MACHINERY



Bulk-Flo Elevator-Conveyor Feeder handling mineral mix from mixers to storage bins.

Vibrating Screens assure removal of oversize chips, slivers and sawdust.



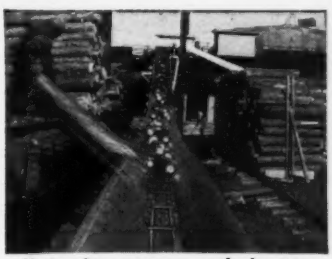
Silent Chain Drives offer the most efficient, low-cost power transmission service.

Screw Conveyors offer many advantages in handling bulk materials — made in all types and sizes.

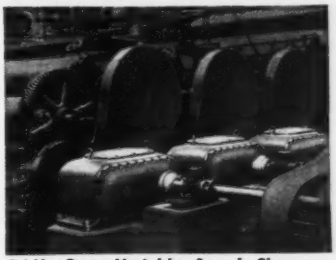
All types and sizes of Belt Conveyor Idlers and Trippers for handling sulphur, lime, salt cake, wet pulp, etc.

Herringbone, Worm and Gearmotor Speed Reducers and Increasers for every power transmission service.

• Submit your materials handling and power transmission machinery problems to Link-Belt. Our experienced engineers will carefully analyze your requirements and make impartial, constructive recommendations. We will be pleased to engineer and supply your complete installation, or if preferred, simply supply the parts desired.

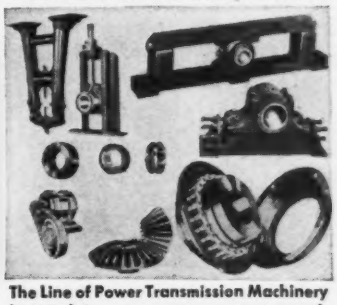


Chains for conveyors and elevators . . . there is a standard Link-Belt Chain for every service.



P.I.V. Gear Variable Speed Changers accurately control speeds on cutters, press-rolls, coaters, pumps, etc.

Slasher table equipped with 14 strands of Link-Belt SM-592 conveyor chain.



The Line of Power Transmission Machinery is complete—one source—one responsibility assures efficient performance.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.

Offices, Factory Branch Stores and Distributors in Principal Cities.

10,784-D

Figure 12 shows a paper-resin laminate under the same conditions of preparation and observation. The fibers bear the cross and longitudinal characteristics of paper pulp. Practically all the fibers are cut directly across and longitudinally and the longitudinal sections are practically parallel.

Cotton flock occurs in molded resins as separate fibers which appear round, oval, "finger-nail," or "coma" shaped, as shown in Fig. 13.

Ground, hard shells are now common fillers in fabricated resins. They are readily identified as a class by the morphological structure of stone cells. Figure 14 shows the resinographic characteristics of walnut shells. Walnut shells may be differentiated *in situ* from apricot and coconut shells, two other common shell flours.

Peanut shell, on the other hand, does not contain stone shells as shown in Fig. 15.

Figure 16 shows some resinographic characteristics of sugar cane.

Figure 17 shows the many determinative characteristics of "hemp-hurds," the pith of the hemp reed.

Asbestos is often encountered in the paper and resin industries and so its appearance by reflected light is shown in Figure 18. The "fibers" are not very long and the associated magnetite is clearly visible.

Electron Micrographs of Replicas

It was mentioned before that it would be difficult to slice a section of cured, filled resin, sufficiently thin to obtain an electron micrograph under practical conditions. Moreover, it is at present impossible to obtain an electron micrograph by the reflection of electrons from a polished cross section. To date the most practical way of obtaining electron micrographs of paper fibers and resin fillers is by means of replicas of the

FIG. 16
Sugar cane (bagasse). In the upper right-hand corner, note the spiral cells, typical of grasses. (135 X)

FIG. 17
"Hemp-hurds," which is the trade name for the pith of the hemp reed. The rings of dots are cross-sections of spiral cells. (135 X)

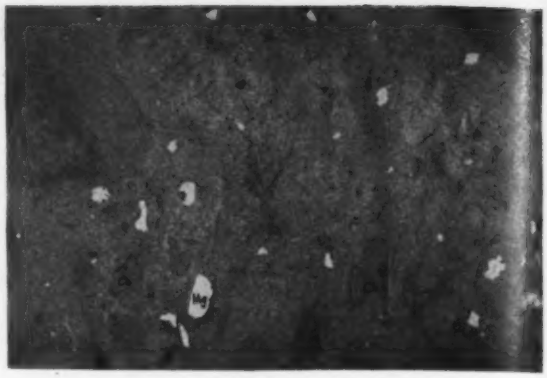


FIG. 18
Chrysolite asbestos, Vermont variety, "floats" grade, in a resin, as polished by the Graton-Vanderwilt machine and photographed by vertical reflected light. Ch = Chrysolite. Mg. = Magnetite, associated mineral. (135 X)

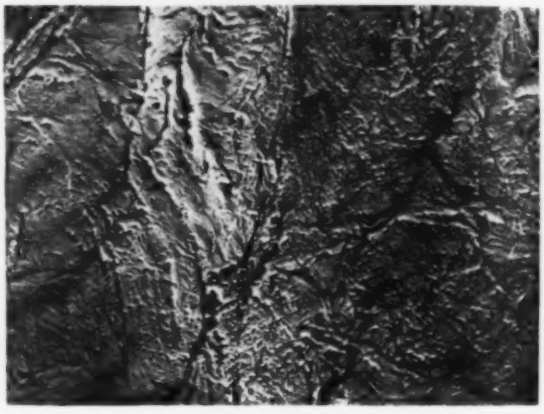


FIG. 19
Electron micrograph of a positive silica replica of the surface of an unsized sheet of sulphite paper. The paper is shown to be composed of felted fibrils. (6,200 X)

FIG. 20
Electron micrograph of a positive replica of the surface of rag filter-paper. The interlocking fibrillae of cotton are clearly shown. (6,570 X)

It's Easy—

WHEN YOU KNOW HOW—

Selecting the right fibre and the best process for a specification paper is a job for experts. You'll find experienced help—and nearly a century of Brown Company research leadership—working in your interests when you bring your paper problems to our technical staff.

An enviable record of manufacturing precision and a complete range of papermaking fibres stand behind our advice and counsel. Our Technical Service Division will be glad to sit in on *your* development problems. For full details, write to one of the sales offices listed below.

BROWN COMPANY

FOREMOST PRODUCERS QUALITY PURIFIED CELLULOSE

PULP SALES OFFICES: 500 FIFTH AVE., NEW YORK 18, N. Y. • 463 CONGRESS ST., PORTLAND 3, ME.
110 S. DEARBORN ST., CHICAGO 3, ILL. • 58 SUTTER ST., SAN FRANCISCO 4, CAL.
BROWN CORPORATION, 906 SUN LIFE BLDG., MONTREAL 2, P.Q., CANADA

FIG. 21

Electron micrograph of a positive replica of part of a viscose fiber, photographed by means of a very slightly oblique, transmitted beam of electrons. The deep grooves represent the striations generally observed by means of an original microscope. (6,620)

surface to be examined. The replica may be either a negative or a positive made from the negative. The negative is made in one operation by forming a thin transparent film on the relevant surface and stripping off the film.† A positive film requires a second step in its preparation but its electron micrograph is easier to interpret. The positive is made from a thick thermoplastic negative by depositing a thin inorganic film which is obtained preferentially by dissolving away the resinous negative.

Figure 19 is an electron micrograph of a positive replica of an ordinary sheet of paper, at 6,200X. Even at this magnification the paper appears to be fibrous. Many of the fibrils are only 0.05μ wide and many more are finer.

Figure 20 is an electron micrograph of a positive replica of filter (cotton rag) paper.

Figure 21 was photographed electron microscopically from a positive silica replica of a fiber of ordinary viscose and Fig. 22 is a comparable electron micrograph of so-called cylindrical viscose. The ordinary viscose shows enlarged grooves which may be seen optically and run parallel to the fiber. The cylindrical "smooth"

† "Protective and Decorative Coatings," edited by J. J. Mattiello, Vol. V, p. 517, John Wiley and Sons, Inc. (1946).

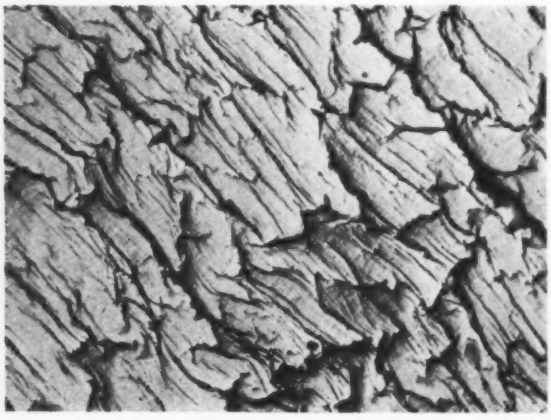


FIG. 22

Electron micrograph taken under conditions similar to those of Fig. 21, but of a "round" viscose fiber. The wrinkles are so fine and cross-hatched that the fiber appears to be quite smooth and round under the optical microscope. (6,380 X)

FIG. 23

Electron micrograph taken under conditions similar to Figs. 21 and 22, but of a resin treated, grooved viscose fiber. The droplets of resin are clearly shown. (6,620)

rayon really has a surface so finely grooved and cross-wrinkled that it appears quite round and smooth under the lower resolving power of the optical microscope.

Figure 23 is an electron micrograph of a positive replica of an ordinary viscose fiber after treatment with a small amount of a resinous colloidal solution. The tiny droplets of resin on the grooved surface of the viscose fiber and concentrated in the grooves are clearly shown.

Literature Cited

1. Protective and Decorative Coatings, edited by J. L. Mattiello, Vol. V, Chapter 5, pp. 476-640, by T. G. Rochow and R. L. Gilbert.

TAPPI Notes

John F. Cipriano, formerly of Chas. W. Speidel & Company, is now president of the Adelphi Research & Mfg. Company, 3505 N. Second Street, Philadelphia 40, Pa.

Gilbert A. Pitman, formerly of the Container Testing Laboratories, Inc., is now chemist for the Kieckhefer Container Company, Alameda, Calif.

Norbert Bernheimer, consulting engineer, has moved from Waterville, Maine to 542 West 112th Street, Apt. 6E, New York 25, N. Y.

Ward D. Harrison, formerly of the Ecusta Paper Company, is now assistant to the executive vice president, Riegel Paper Corporation, 342 Madison Ave., New York, N. Y.

Thomas J. Desmond of E. I. du Pont de Nemours & Co., has been transferred from Minneapolis to Wilmington, Del.

O. W. Frost, formerly of the U. S. Gypsum Company, is now with the Stimson Lumber Company, Forest Grove, Ore.

The Technical Section of the Papermakers' Association of Great Britain and Ireland is now located at St. Winfred's, Welcomes Road, Kenley, Surrey, England.

John H. Hall has succeeded H. V. Peterson (retired) as official representative of the De Laval Steam Turbine Company in the Technical Association.

Myrl N. Davis is now associate technical director for the Kimberly-Clark Corporation, Neenah, Wis.

Donald T. Jackson has succeeded Bjarne Johnson (deceased) as director of laboratories, Hammermill Paper Company, Erie, Pa.

JUST TRY AND GET THROUGH A DAY WITHOUT PAPER

You want to send a telegram...
Look up a telephone number...
Read a magazine...
Order from a catalog...

Without lightweight printing papers—like those made by St. Regis—you couldn't do any one of these things that you take so for granted. The paper in a school tablet or a pack of cigarettes may well be St. Regis, too. And those lightweight pages of your Encyclopedia Britannica are one of its proudest uses. St. Regis Papers were chosen because they take print so beautifully, yet hold down bulk to a minimum.

To make paper for so many important uses, and to keep searching, as St. Regis does, for new and better ways, needs the assurance of a never-ending supply of raw material. St. Regis gets — and gives — this assurance by largely owning its own timberlands and by managing them scientifically for sustained yield.

In its 43 plants throughout North and South America, St. Regis also manufactures: Heavy-duty multi-wall paper bags for shipping over 400 products... Automatic bag-filling machines..."Tacoma" bleached and unbleached sulphate pulp... Panelyte, the St. Regis structural laminated plastic.

ST. REGIS PAPER *Company*

230 PARK AVENUE, NEW YORK 17, N. Y.
St. Regis Products are sold by St. Regis Sales Corporation: Offices in New York • Chicago • Baltimore • San Francisco and 20 other industrial centers.
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

PRODUCTS FASHIONED FROM GROWING TREES TO SERVE ESSENTIAL INDUSTRIES

Federal Legislation on Water Pollution Control*

By Arthur D. Weston[1]

Abstract

This paper discusses in detail the two bills before the 80th Congress (S. 418 and H. R. 3990) to provide for water-pollution-control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency. It shows that one of these bills (S. 418) has already passed the Senate and that the other (H. R. 3990) as H. R. 123 has had hearings by the Committee on Public Works of the House of Representatives. It shows that, while loans only would be made available under S. 418 for the preparation of engineering reports and for plans and for the construction of remedial works, both grants-in-aid or loans would be made available under H. R. 3990. Grants-in-aid or loans would be limited to 33-1/3% of the reasonable cost of the project. An important difference in the two bills is that, while both bills (S. 418 and H. R. 3990) provide for mandatory proceedings against those causing pollution, H. R. 3990 would prevent pollution from any "new outlet" except with the approval of the Surgeon General.*

According to this paper the results of a questionnaire sent out to State Departments of Health showed that these departments leaned toward a Federal Act providing for studies and investigations rather than Federal Police Power.

The paper further shows the adequacy and inadequacy of State laws on water pollution control and indicates that, unless pollution control is properly exercised by State or interstate agencies, Federal control is inevitable.

* *Rewritten as H. R. 3990.*

Are we to have Federal Water Pollution Control? That is a question which may well be answered by the 80th Congress as there are before that Congress four bills—"To provide for water-pollution-control activities in the Public Health Service of the Federal Secuity Agency and in the Federal Works Agency and for other purposes."

Control Bills

According to the testimony of Dr. Thomas Parran, Surgeon General of the United States Public Health Service, presented at the hearing before the Committee on Public Works of the House of Representatives of the Eightieth Congress held on Wednesday, June 11, 1947, there have been water pollution control measures before all but six Congresses since the 55th Congress in 1897; "separate bills were passed by the House and Senate" in 1936 and in 1938 "both Houses passed a bill which failed to get Presidential approval only because of the administrative aspects pertaining to the budgetary structure of the Federal Government." Also "separate bills were again passed in 1940 but agreement was not reached on any single bill." The library of Congress Legislative Reference Service shows water pollution control bills have been before Congress as follows:

Date	Congress	Bill Numbers	Number of Bills
1897–1898	55th	S. 2905—HR. 5432, 19059	3
1899–1900	56th	S. 559—HR. 5, 5794	3
1909–1911	61st	HR. 14530, 32938	2
1911–1912	62nd	HR. 728, 27149	2
1913	63rd	HR. 218, 8628, 8858	3
1915–1916	64th	HR. 685, 16893	2
1917	65th	HR. 346	1
1921–1922	67th	S. 1320, 2414, 3311, 3968 HR. 6613, 7569, 7430, 8730, 8783, 10238, 10956, 12446 H.J.Res. 216, 247, 297	15
1923–1924	68th	S. 42, 936, 1385, 1942, 2414 HR. 51, 203, 612, 690, 3319, 6256, 9175, 9199	13
1925–1926	69th	S. 94, 1717 HR. 3786, 5382, 8310, 9570, 10903, 10904, 13142	9
1928	70th	HR. 9282	1
1929–1930	71st	HR. 3588—S. 4375	2
1931–1932	72nd	HR. 163, 12700	2
1933	73rd	HR. 94	1
1935–1936	74th	S. 3958, 3959, 4627 HR. 8992, 11064, 12101, 12102, 12103, 12764—H.Res. 296	10
1937	75th	S. 13, 15 HR. 2711, 3419, 6076	5
1939–1940	76th	S. 685, 3617 HR. 1951, 2890, 4314, 7971	6
1941	77th	S. 1121, 1913 HR. 1110, 3778, 4106, 5676	6
1943–1944	78th	S. 186 HR. 98, 2231, 3171, 3337, 3610 H.J.Res. 68, 303	8
1945–1946	79th	S. 1037, 330, 535 HR. 519, 587, 592, 4070, 6024	8
1947	80th	S. 418—HR. 123, 315, 470	4
		Total	106

In addition to the above referred to bills there have been certain river basin development bills filed with Congress which would have given the power of water pollution control to Federal agencies indirectly for example—S. 460, 555 and 737 and H.R. 1824 and 2540 of the 79th Congress.

Up to the time of writing this paper, final action has not been taken by the 80th Congress in connection with S. 418 and HR. 123, 315, and 470. However, hearings have been given by the Senate Committee on Public Works on S. 418 and this bill somewhat modified from the original was passed by the Senate on July 16, 1947. Hearings on HR. 123, 315, and 470 were given by the Committee on Public Works of the House of Representatives on June 11, 12, 13, and 16 of 1947, but action on these bills thus far has not extended beyond the hearing stage.

Of the bills filed with the 79th Congress, HR 4070 met with the approval of the Conference of State Sanitary Engineers and of the Association of State and Territorial Health Officers. This conference is made up of members of Divisions of State Sanitary Engineers of State Departments of Public Health and certain members of the U. S. Public Health Service. The Association of State and Territorial Health Officers is made up the Commissioners of Public Health of the various States and certain health officers of the U. S. Public Health Service. Federal power under H.R. 4070 was pretty much limited to investigation by the U. S. Public Health Service upon invitation by the States and for financial assistance to State agencies having charge of stream pollution control to assist in State investigations and for grants-in-aid and loans to municipalities and

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Chief Engineer, Massachusetts Department of Public Health, and Chairman "Committee on National Water Policy" Conference of State Sanitary Engineers.

WEST VIRGINIA PULP and PAPER COMPANY

230 Park Ave.
New York 17, N. Y.

35 East Wacker Drive
Chicago 1, Ill.

Public Ledger Building
Philadelphia 6, Pa.

503 Market St.
San Francisco 5, Calif.

Manufacturers of West Virginia Mill Brand Papers

SUPERCALENDERED
ENGLISH FINISH
LITHOGRAPH
LABEL
OFFSET
EGGSHELL
MUSIC
POSTER
BOND

WRITING
ENVELOPE
MIMEOGRAPH
INDEX BRISTOL
POST CARD
COVER
CUP AND CONTAINER
FILE FOLDER
TAG

MACHINE COATED

KRAFT CONVERTING AND KRAFT ENVELOPE
KRAFT LINER BOARD

MILLS

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

loans to industries for the construction of remedial works for pollution control in accordance with plans approped by the U. S. Public Health Service and the State water pollution control agencies. This bill attracted the attention of many technical societies and some of these societies elected representatives to meet with representatives of other societies with the view of obtaining some form of bill which would be acceptable to all. Among these societies was the Conference of State Sanitary Engineers which met in Cleveland on November 10, 1946.

At this point it should be stated that at the meeting in Cleveland held on November 10, 1946, the Conference of State Sanitary Engineers directed its Committee on National Water Policy to arrange for a conference with representatives of other technical societies and with other interested parties, with the view of reaching an agreement, if practicable, on Federal legislation if such legislation was to become a reality. Accordingly, in accordance with this directive the writer, as Chairman of the Committee, called a meeting in New York City which was held on Friday, November 22, 1946, in the rooms of the Board of Directors of the American Society of Civil Engineers. The following responded to the invitation and attended the conference:

Mr. James H. Allen, Executive Secretary, Interstate Commission on the Delaware River Basin.
Mr. Hudson Biery, Chairman, State Commission on Stream Pollution in Ohio River Valley.
Mr. William W. Brush, Editor, Water Works Engineering.
Mr. Earl Devendorf, Assistant Director, Division of Sanitation, State Health Department, Albany, N. Y.
Mr. Seth G. Hess, Director, Interstate Sanitation Commission.
Mr. Elmer Higgins, United States Fish and Wildlife Service.
Mr. Kenneth A. Reid, Executive Director, Izaak Walton League of America.
Mr. Sol Pincus, Senior Sanitary Engineer, Department of Health, New York, N. Y.
Mr. Carl E. Schwob, Sanitary Engineering Division, United States Public Health Service.
Mr. Warren J. Scott, Director, Bureau of Sanitary Engineering, Department of Health, Hartford, Connecticut.

As a result of that conference a bill was drafted substantially in accordance with the original draft of S. 418 and this draft was finally made available for filing through Senators Taft and Barkley. The similar bills H.R. 315 and H.R. 470 were filed by Congressmen Spence and Elston, respectively. H.R. 123 which differed somewhat from S. 418 was filed by Congressman Mundt.

Pending Legislation

Of the bills filed with the 80th Congress S. 418 and H.R. 315 and H.R. 470 were practically identical bills, and H.R. 123 was not greatly different. However, S. 418 was changed somewhat in its passage by the Senate and H.R. 123 has been rewritten as H.R. 3990. These two latter bills might well be considered the only competitive bills before Congress. Accordingly, discussion by the speaker will be limited to S. 418 as passed by the Senate and H. R. 3990 which is the rewritten H.R. 123. Both of these bills are alike in that:

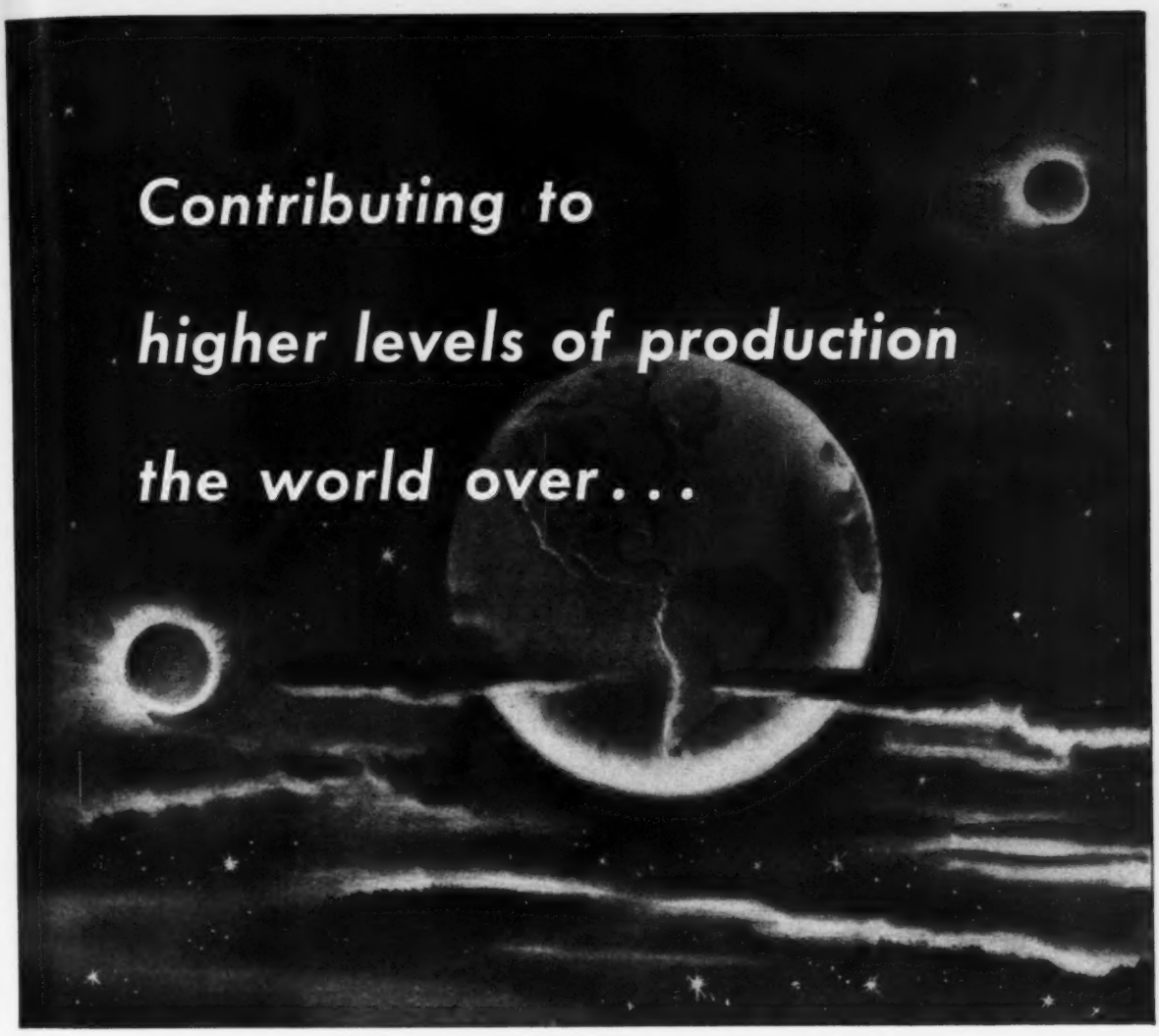
They declare it to be the policy of Congress in the development of pollution abatement programs to recognize, preserve and protect the primary responsibilities of the States in controlling water pollution and for providing for water pollution control activities to be set up in the U. S. Public Health Service, of the Federal Security Agency and in the Federal Works Agency.

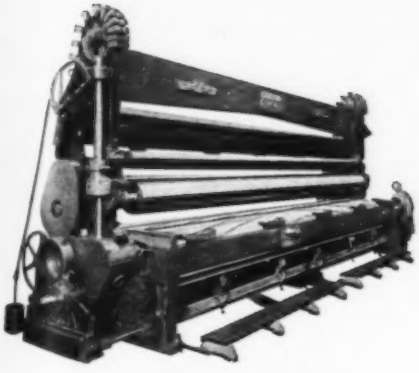
Both bills provide for investigations by the Surgeon General in connection with other Federal agencies, with State water pollution agencies and interstate agencies and with municipalities and industries involved, and prepare or adopt comprehensive programs for eliminating or reducing the pollution and improving the sanitary condition of the surface and underground waters in or adjacent to any State.

Both bills encourage cooperative activities by the States for the prevention and abatement of water pollution, the enactment of uniform State laws relating to water pollution and the encouragement of compacts between

WATER POLLUTION CONTROL IN STATES

State	Does State Law Give Agency Water Pollution Control? Yes or No	Date of Law	Agency Having State Water Pollution Control	Other State Agency Sharing Water Pollution Control	Does Law Permit Issuing Orders and Court Action?	Are There Any Deficiencies in Law?	Remarks
Alabama	No						
Arizona	Yes	1943	State department of health	None	Yes		Special orders issued and enforced by State superintendent of health
Arkansas	Yes	1941	Fish and game commission	State board of health	Yes		Copy of law not submitted
California							
Colorado	Yes		State health department	None	Yes		
Connecticut	Yes	1918	State department of health	State water commission	Yes		Copy of law not submitted
Delaware	No						Bill to establish pollution control agency vetoed by Governor May 5, 1947
Florida	Yes	1927	State board of health	None	Yes		Fine of not over $500 in any court of competent jurisdiction
Georgia	No						
Idaho	Yes	1889	Dept. of fish and game	None	Limited	Yes	Laws inadequate and out of date
Illinois	Yes	1929	Sanitary water board	Department of mines and minerals	Yes		Penalty, fine $100. Each day's continuance constitutes separate offense
Indiana	Yes	1943	Stream pollution control board	None	Yes		Penalty, fine $25 to $100, also imprisonment for not over 90 days
Iowa	Yes	1925	State department of health	None	Yes	Not effective within 5000 feet of contiguous waters	Penalty, fine not over $1,000 or imprisonment for failure to pay
Kansas	Yes	1907	State board of health	None	Yes		Penalty, fine $25 to $100. Each day constitutes separate offense
Kentucky	Yes	1911	State board of health	Fish and game commission	Yes	Penalties not stated	
Louisiana	Yes	1940	Stream control commission	Department wildlife and fisheries	Yes		Penalty, fine $25 to $1,000 or imprisonment for 1 year or both
Maine	Yes	1941	State sanitary water board	Public utilities commission	Yes	No license to discharge wastes required for esist-ing establishments	Attorney General may institute injunction proceedings to enjoin violation





CAMACHINE 20, the largest of the mill type Camachines, is a popular pacemaker in high speed paper mill operation. Camachine 20 produces firm, uniformly wound rolls of newsprint, kraft or book paper at speeds up to 4000 fpm, handling webs from 180" to 310".

SWIFT CAMACHINES are singing a song of production in every continent of this world. Side by side with other great products of American engineering skill, Camachines are helping the peoples of all countries to rebuild toward a better life. At home, Camachines are meeting every industrial slitting and roll-winding problem to help boost production to the higher levels which must be achieved in the years ahead. For competent assistance with your roll production problems, consult

Cameron Machine Company, 61 Poplar Street, Brooklyn 2, N. Y.

Camachines

FOR FAST, TOP QUALITY ROLL PRODUCTION

. . . the world over

States for this purpose to make available the results of surveys, studies, investigations and experiments, and carry a provision to give consent of the Congress to two or more States to negotiate and enter into agreements or compacts.

Both bills provide that the Surgeon General "upon request of any State water-pollution agency or interstate agency" may conduct investigations and make surveys of any specific problem of water pollution confronting a State, interstate agency, community, municipality, or industrial plant.

Both bills provide that the Surgeon General shall prepare and publish reports relative to surveys, studies, investigations, and experiments, together with appropriate recommendations with regard to the control of pollution.

Both bills provide that the Federal Works Administrator be authorized to make loans to State, municipality, or interstate agencies and to industrial enterprises for the construction of treatment works. Loans under S. 418 and grants-in-aid or loans under H.R. 3990 are provided for State, municipal or interstate agencies and for loans to industrial enterprises under H.R. 3990 and S. 418 for the preparation of engineering reports, plans and specifications relating thereto. H.R. 3990 would go so far as to make grants-in-aid, loans, or both, to State, municipal or interstate agencies for the construction of remedial works. Grants-in-aid are not provided in S. 418. Such grants-in-aid and loans, however, would be limited to projects approved by the Surgeon General. In the case of loans, which is the only aid given in S. 418, and in the case of grants-in-aid under H.R. 3990, the amount is limited to 33⅓% of the reasonable cost of the project. Interest rate on loans under S. 418 is set at "2 per centum per annum" with no limit as to time, except in the case of industry which is limited to 10 years. Under H.R. 3990 the limit also is 10 years to industry and the interest rate on loans to either industry or state water-pollution agencies under H.R. 3990 is "at the rate prescribed by the President."

Both S. 418 and H.R. 3990 provide for the Surgeon General and the Federal Works Administrator in carrying out their respective functions to provide for *review* of the reports of examinations, investigations, plans, studies, and surveys and that consideration shall be given to the public benefits to be derived, the propriety of Federal Aid, the relation of the ultimate cost of construction and maintaining the works to the public interest, the public necessity for the works and the adequency of the provisions made or proposed by the applicant for the grant-in-aid (in the case of H.R. 3990) or loan for assuring proper and efficient operation and maintenance of the works after completion.

Both bills provide for a "Water Pollution Control Advisory Board" to consist of:

1. The Surgeon General or a sanitary engineer officer designated by him, who shall serve as chairman.
2. A representative of the Department of War.
3. A representative of the Department of the Interior.
4. A representative of the Federal Works Agency.
5. A representative of the Department of Agriculture and
6. Six persons (not officers or employees of the Federal Government) to be appointed *annually* by the President.

Relative to these six persons

One shall be an engineering expert on sewage and waste disposal;

One shall be an interested party in the field of wildlife conservation;

and, except as the President may determine,

One shall represent municipal government;

One shall represent State government;

One shall represent affected industry.

This Board must review the policies and program of the Public Health Service as undertaken under the act and

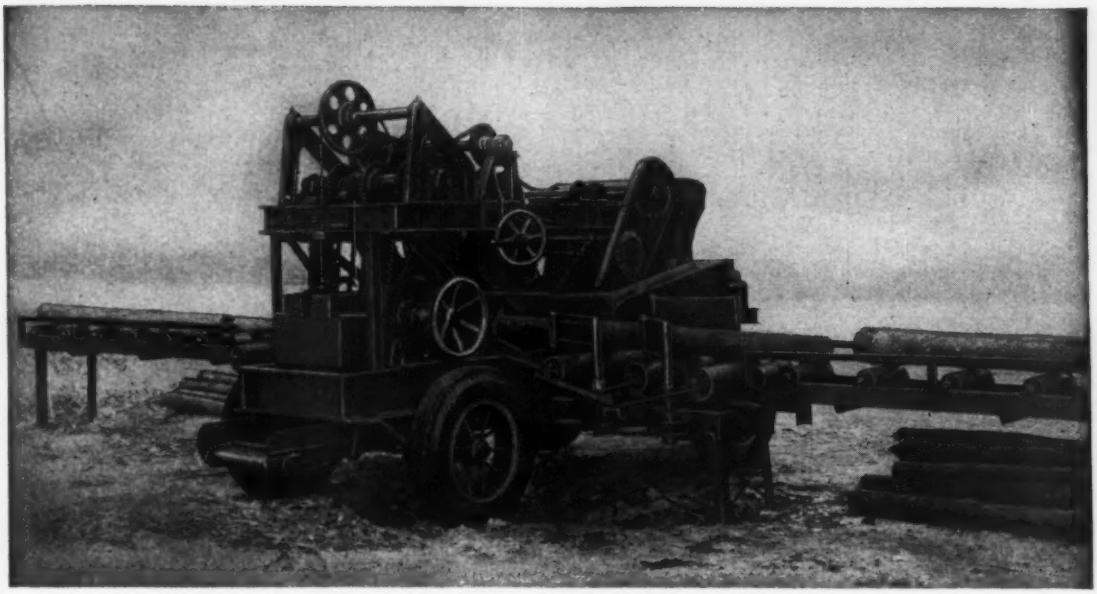
WATER POLLUTION CONTROL IN STATES—*Continued*

State	Does State Law Give Agency Water Pollution Control? Yes or No	Date of Law	Agency Having State Water Pollution Control	Other State Agency Sharing Water Pollution Control	Does Law Permit Issuing Orders and Court Action?	Are There Any Deficiencies in Law?	Remarks
Maryland	Yes	1947	Water pollution control commission	State board of health	Yes		Penalty, fine to $500, or imprisonment to 90 days or both
Massachusetts	Yes	1945	Department of public health	Department of conservation	Yes		
Michigan	Yes	1929	State stream control commission	None	Yes		Penalty, fine $25 to $100, or imprisonment to 90 days or both
Minnesota	Yes	1945	Water pollution control commission	State department of health	Yes	No specific penalties provided	Violation a misdemeanor, may cooperate with other States
Mississippi	Yes	1946	Game and fish commission	State health department	Yes		Copy of law not submitted
Missouri	No				No		Regulation based on broad health powers of Division of Health and Conservation Commission
Montana	Yes	1945	State board of health		Yes	Yes	Stream pollution powers are vague
Nebraska	No						Various statutes prohibit pollution. Action may be brought by most any official
Nevada	Yes	1939	State health department	None	Yes		Copy of law not submitted
New Hampshire	Yes	1947	New Hampshire water pollution commission	State department of health	Yes		1947 legislation if passed will provide fine not exceeding $1000 for each day of violation
New Jersey	Yes		State department of health		Yes	Yes	Not effective in Passaic Valley Sewerage District. Pasaic River — Paterson to mouth
New Mexico							
New York	Yes	1903	State department of health	State conservation department	Yes	Yes; sources of pollution existing in 1903 exempt	Orders require approval by Governor and Attorney General. Varying fines provided
North Carolina	Yes	1945	State stream sanitation and conservation commission	State board of health department of conservation and development	No	Yes	Committee to study stream pollution and make recommendation

Peel your pulpwood the new way with

Nekoosa Portable Wood Peeler

... Save manpower ... Save freight ... Save money



THE Nekoosa Portable Wood Peeler will clean practically all species of pulpwood in diameters from 3 to 12". It handles hard woods exceptionally well.

The removal of bark in the woods cuts freight costs and means a better scale—The Nekoosa Portable Wood Peeler cuts labor costs. Five men have actually peeled 6 cord per hour using this machine.

Post treaters are also using this equipment for peeling fence posts prior to treating.

Ask us for additional information.

Nekoosa Foundry & Machine Works Inc.

Nekoosa, Wis.

Other Products

Bark Press	**Chip Cutter**	**Washers**
Flat Screens	**Agitators**	**Digester Fittings**
Ball Valves	**Deckers**	**Press Marking Equipment**

make recommendations *in reports* to the Surgeon General.

Both bills authorize annual appropriations of $100,000,000 for loans under S. 418 and for grants-in-aid and loans under H.R. 3990.

Both bills authorize appropriations for the Federal Security Agency and the Federal Works Agency each fiscal year for them to carry out their respective functions.

Both bills provide for $5,000,000 to be appropriated each fiscal year for the Federal Security Agency to allot agencies for investigations, surveys, and studies for to States for expenditure by or under the direction of their respective water pollution agencies and to interstate prevention and control of water pollution. In addition, S. 418 has a provision for the Federal Works Agency beginning with the fiscal year ending June 30, 1948, to use the sum of $12,000,000 "to make advances to States, municipalities, or interstate agencies to aid in financing the cost of engineering, architectural, and economic investigations and studies, surveys, designs, plans, working drawings,, specifications, procedures, and other actions preliminary to the construction projects." These advances are repayable without interest upon commencement of construction of the project.

Provisions are made in each bill for the appointment by the U. S. Public Health Service of engineer and scientist officers but not more than five such additional officers and with the consent of any other Federal agency for the Federal Security Administrator to utilize the officers and employees of these other Federal agencies in carrying out the purposes of the Act.

Both bills in general provide for financing the projects through the Federal Works Administrator as follows:

Upon written request of the Federal Works Administrator, the Federal Security Administrator would specify particular projects approved by the Surgeon General with the total estimated costs, the sum requested for loans (also the sum requested for grants-in-aid in the case of H.R. 3990) within the amount appropriated and the Federal Security Administrator would transfer such funds for the use of the Federal Works Administrator who would then make the loans or grants-in-aid as the case might be in order or sequence of priority as was established for the projects by the Surgeon General. The Federal Works Administrator would then

". . . take such measures as, in his judgment, will assure that the engineering plans and specifications, the details of construction, and the completed treatment works conform to the project as approved by the Surgeon General . . ."

The Federal Works Administrator would be obliged to:

". . . furnish written reports to the Federal Security Administrator on the progress of the work."

Provision is made in each bill for the *Federal Works Administrator*

". . . to hold, administer, exchange, refund, or sell at public or private sale any bonds or other obligations evidencing any loans made under . . ." the "Act, and to collect, or provide for the collection of, interest on and principal of such bonds or other obligations."

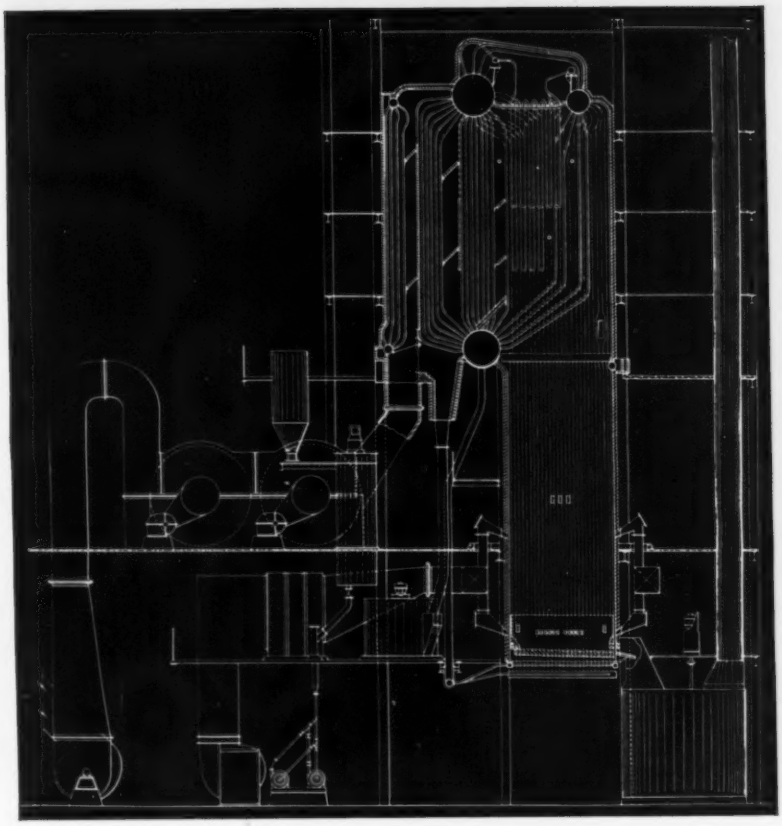
All money so collected would revert to the "Treasury as miscellaneous receipts."

The definitions in S. 418 and H.R. 3990 are identical and two of these definitions should be emphasized as they are of particular importance to the provisions of the act. They are the definition of "treatment works" and the definition of "interstate waters" as follows:

"The term 'treatment works' means the various devices used in the treatment of sewage or industrial waste of a liquid nature, including the necessary intercepting sewers, outfall sewers, pumping, power, and other equipment, and their appurtenances, and includes any extensions, improvements, remodeling, additions, and alterations thereof;"

WATER POLLUTION CONTROL IN STATES—*Continued*

State	Does State Law Give Agency Water Pollution Control? Yes or No	Date of Law	Agency Having State Water Pollution Control	Other State Agency Sharing Water Pollution Control	Does Law Permit Issuing Orders and Court Action?	Are There Any Deficiencies in Law?	Remarks
North Dakota	Yes	1939	State water conservation commission and State health department	None	Yes		
Ohio	Yes	1935	State department of health	None	Yes	Yes; exemptions re contiguous waters and mine wastes	Penalty-fine $100-$500 for each 30 day period. Law pertains to gross pollution
Oklahoma	Yes		State board of health	State planning and resources board. State corporation commission	Yes		Penalty-fine $25-$100 for each day
Oregon	Yes	1938	Oregon State sanitary authority	None	Yes		Santiary Authority authorized to enter into interstate compacts for pollution control
Pennsylvania	Yes	1923	Sanitary water board	None	Yes		Penalty-fine, $100-$500
Rhode Island	Yes	1920	State department of health	None	Yes	Yes, sewage of Newport, Jamestown, and North Shoreham exempt	Penalty-fine to $500 or imprisonment to 1 year for each month
South Carolina	No						
South Dakota	Yes	1935	Commission on water pollution	None	Yes		
Tennessee	Yes	1945	Stream pollution control board	Department of public health	Yes	Yes	Control only "excess" pollution. Penalty fine $50-$500 for each day
Texas	Yes	1925	State department of health	State game and fish, oyster commission	Yes		Penalty-fine $100-$200 for each day
Utah	Uo						
Vermont	Yes	1904	Department of public health	Conservation department (1941)	Yes		Copy of law not submitted
Virginia	Yes	1946	State water control board	State department of public health	Yes		Penalty-fine $50-$500 for each day
Washington	Yes	1945	State pollution control commission	State department of health	Yes		Penalty—$100 or imprisonment for 1 year or both
West Virginia	Yes	1929	State water commission	Health department conservation commission	Yes	Yes, coal mining and mine drainage excluded	Penalty—fine $100 for each day
Wisconsin							
Wyoming	Yes	1923	State board of health	Fish and game department	Yes	Yes	Pertains only to domestic supplies and damage to fish
District of Columbia	No						Police dept. empowered to prevent pollution of streams by garbage, offal, etc.



Weyerhaeuser Timber Company selects *the C-E Recovery Unit*

A C-E RECOVERY UNIT, cross-sectional elevation of which is shown at the right, was recently purchased by the Weyerhaeuser Timber Company of Longview, Washington, for its new mill at Springfield, Oregon.

The unit is designed to burn 464,000 pounds of black liquor solids per 24 hours and will produce steam at 570 psi and 675 F.

The C-E Recovery Unit's reputation for efficiency, reliability, and operating economy is built on a sound basic design enhanced over the years by the addition of carefully developed improvements. The Weyerhaeuser unit will incorporate these many service-proved advantages. B-206

C-E

COMBUSTION ENGINEERING

200 Madison Avenue, New York 16, N. Y.

C-E PRODUCTS FOR the paper industry include steam generating, fuel burning and related equipment; also many types of pressure vessels.

It will be noted that this definition goes somewhat beyond what is usually known as treatment works, but it appears to be a wise definition as it includes all the works which will be required to intercept any sewage or industrial waste which might otherwise be discharged into a watercourse without treatment and provides for the final disposal of the treated product in an acceptable manner. Without such an all-inclusive definition, confusion would result in connection with the financing of any project with Federal participation if the sewage or industrial waste were to be disposed of adequately.

The other definition which relates to "interstate waters" is as follows:

"The term 'interstate waters' means all rivers, lakes, and other waters that flow across, or form a part of, State or international boundaries."

The writer does not like this definition as under a court decision it might be interpreted as not including the waters contributed to a stream from the drainage area common only to the State located at the lower end of the main drainage basin. Drainage from the area common only to such lower State could include and contribute gross pollution to the main stream in a manner that would affect migratory fish life and would permit unfair industrial competition in that State as compared with the State or States located higher up on the main stream if not regulated. Such an interpretation appears even more as a reality when one reads the following clauses which are included in paragraph (d) (1) of Section 2 of S. 418 and paragraph (d) of Section 2 of H.R. 3990.

S. 418, Sec. 2, (d). (1) ". . . *pollution of interstate waters* . . . which endangers the health or welfare of persons in a State other than that in which the discharge originates, is hereby declared to be a public nuisance . . ."

(2) ". . . the Surgeon General . . . shall give formal notification thereof to the person or persons discharging any matter causing or contributing to *such pollution* . . ."

H.R. 3990, Sec. 2, (d) "Whenever the Surgeon General . . . finds that the *pollution of interstate waters* in or adjacent to any State or States . . . is such as to endanger the health or welfare of persons in a State other than that in which the matter is discharged, he shall give formal notification thereof to the person or persons discharging the matter causing or contributing to *such pollution* . . ."

It will be seen from these quotations that adefuate control of pollution may prove not to be adequate under these bills.

It is very difficult to compare S. 418 as it passed the Senate and H. R. 3990 which is a substitute bill for H.R. 123, so far as the provisions relating to the enforcement proceedings are concerned because of the difference in arrangement of the bills and phraseology in this regard.

There is a sharp difference between the two in that H.R. 3990 has a provision that after enactment of the act " . . . there may be no new outlet . . ." for the discharge of sewage or industrial wate or other polluting matter into interstate waters except with the approval of the Surgeon General. S. 418 does not have this provision.

S. 418 in sub-paragraph (d) (1) of Section 2 provides that pollution of interstate waters which are adjacent to any State or States whether or not the matter contributing to pollution is discharged directly or indirectly into such waters, which endangers the health or welfare of persons in a State other than that in which the discharge originates is a public nuisance and subject to abatement as provided in that bill. This provision is unique in that in some respects it defines interstate waters so far as pollution is concerend within the meaning of the act. H.R. 3990 has a similar provision in paragraph (d) of Section 2.

Paragraph 2 of S. 418 as passed the Senate provides that whenever the Surgeon General on the basis of investigations, studies, etc. finds any pollution declared to be a public nuisance within the meaning of paragraph (1) he should give formal notification thereof to those causing or contributing to the pollution and shall advise the water pollution agency or interstate agency of the State or States where it occurs. This notification may outline recommended remedial measures and a reasonable time to carry them into effect. Failure to commence action to secure abatement within the time specified is then to be brought to the attention of those causing the pollution and again to the attention of the agency of the State or States where the discharges originate. Again this notification may be accompanied by a recommendation that the agency initiate suit to abate the pollution. Similar provisions are contained in paragraph (d) of Section 2 of H.R. 3990.

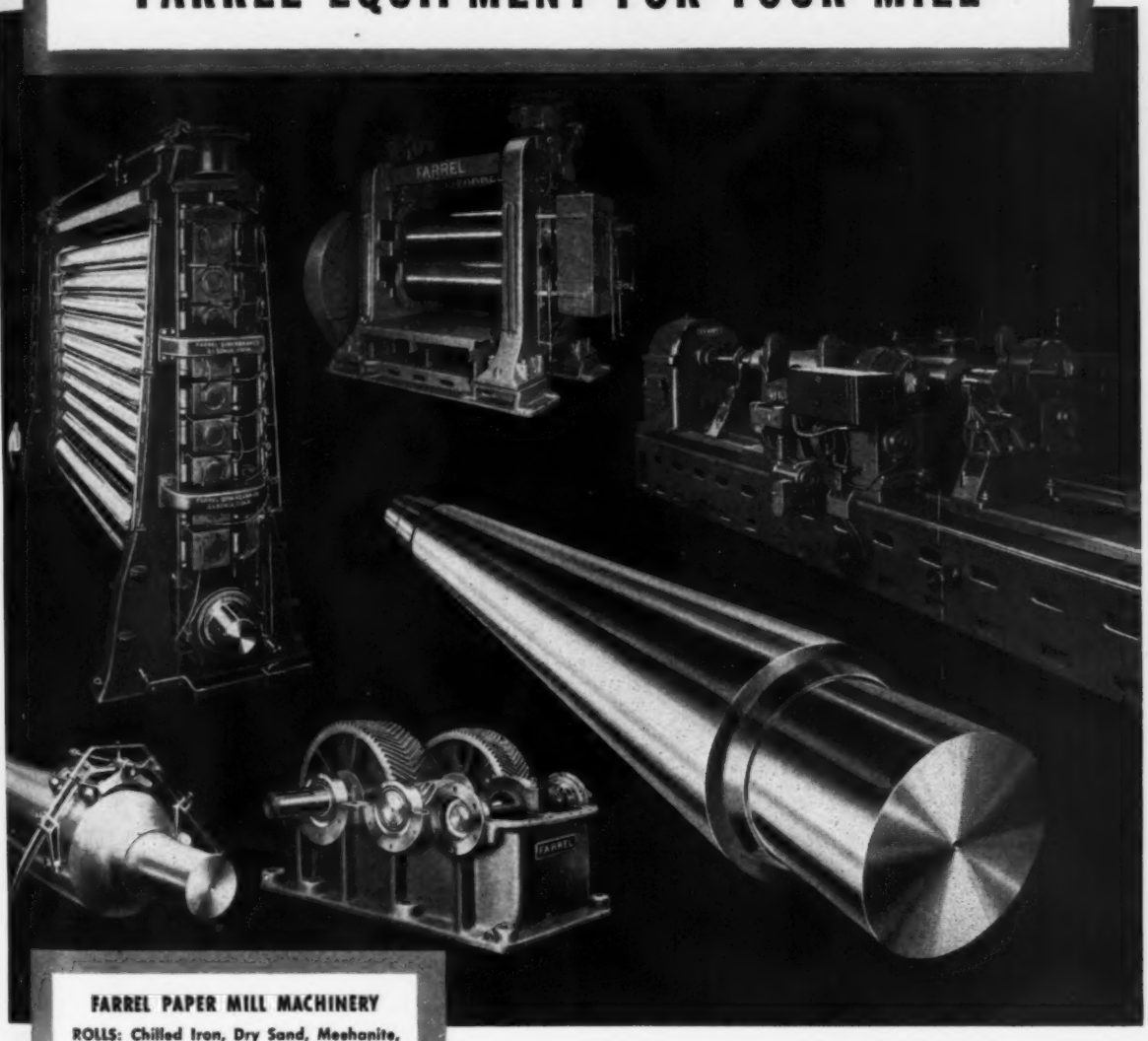
Sub-paragraph (3) of paragraph (d) of the said Section 2 of S. 418 provides that if within a reasonable time after the second notification by the Surgeon General the persons responsible for the pollution fail to initiate action to abate the pollution or the State Water Pollution Agency or Interstate Agency fails to initiate suit to secure abatement the Federal Security Administrator is authorized to call a public hearing to be held in or near where the discharge or discharges originate, this hearing to be given before a board of five persons appointed by the Administrator who ". . . may be officers or employees of the Federal Security Agency or of the water pollution agency or interstate agency where such discharge or discharges originate (except trat at least one of the members of the board shall be a representative of the water pollution agency of the State or States where such discharge or discharges originate, and at least one shall be a representative of the Department of Commerce, and not less than a majority of the board shall be persons other than officers or employees of the Federal Security Agency). On the basis of the evidence prepared at the hearing this board must then make recommendations to the Federal Security Administrator which it feels is reasonable and equitable to abate the pollution. H.R. 3990 differs from S. 418 in this regard in that H.R. 3990 would require a hearing by the board . . . "if such water pollution agency or interstate agency does not *forthwith* initiate such a suit for the person or persons discharging the matter do not *forthwith* initiate such action . . .".

The next step in the procedure which is contained in sub-paragraph 4 of the said paragraph (d) of S. 418 and in paragraph (d) of H.R. 3990 provides that after affording the person or persons causing the pollution reasonable opportunity to comply with the recommendations of the board, the Federal Security Administrator *may* with the consent of the water pollution agency of the State or States in which the pollution takes place request the Attorney General of the United States to bring suit on behalf of the United States to secure abatement. H.R. 3990 differs from S. 418 in this respect in that it uses the word "shall" instead of "may."

Paragraph (5) of Section 2 of S. 418 provides that before or after a suit is commenced under paragraph (4) the person causing the pollution *may* with consent of the water pollution agency be joined as a defendant and the court shall have power to enforce its judgment. H.R. 3990 is mandatory in this respect and provides that the suit *shall* be brought as an action in equity in the district court of the United States for the district in which the pollution occurs.

Under paragraph (6) of the said Section 2 of S. 418 it is provided that in any suit brought pursuant to paragraph (4) in which two or more persons in different judicial districts are originally joined as defendants, the suit may be commenced in the judicial district in which any discharge caused by any of the defendants occurs.

FARREL EQUIPMENT FOR YOUR MILL



FARREL PAPER MILL MACHINERY

ROLLS: Chilled Iron, Dry Sand, Meehanite, Alloy Iron, Steel, Chromium Plated
FOR: Calender Stacks
Board Calenders
Super Calenders
Glassine Calenders
Friction Rolls
Breaker Rolls
Smoothing Rolls
Coating Rolls
Creping Rolls
Plater Rolls
Cutting Rolls
Paraffining and Waxing Rolls
Saturating Rolls
Silicating Rolls
Miscellaneous Special Purposes
CALENDERS: Paper and Board
GRINDING MACHINES: Roll
CALIPERS: Roll
GEARS, CUT: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
SPEED REDUCING GEAR UNITS
SPEED INCREASING GEAR UNITS
FLEXIBLE COUPLINGS

The next time you need precise, long-lived rolls, a *designed-for-the-job* calender, a precision roll grinder, a caliper for quick and accurate roll checking, a quiet and efficient speed reducer, or any of the other equipment listed here, call Farrel. This equipment is made by a company that has been working for the paper industry for nearly a century, and knows its most exacting requirements.

You can get complete information and engineering help promptly, on request. No obligation, of course. FB-395

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston

Farrel-Birmingham

The court in accordance with paragraph (7) of Section 2 of S. 418 *shall* receive in evidence a transcript of the proceedings before the board and a copy of the board's recommendation and *may* receive further evidence as the court may decide. The court must give due consideration to the practicability and to the physical and economic feasibility of securing abatement of any pollution proved, shall have jurisdiction to enter such judgment, and orders enforcing such judgment, *as the public interest and the equities of the case may require.*

As has been previously stated H. R. 3990 carries a provision to prevent the establishment of any "new outlet." This provision is contained in sub-paragraph (e) of Section 2 and provides that "After the enactment of this Act there may be no new outlet, except with the approval of the Surgeon General in accordance with regulations prescribed by him, for the discharge of any industrial waste, sewage, or other matter which will cause or contribute to the pollution of interstate waters (whether such matter is discharged directly into such waters or reaches such waters after discharge into a tributary of such waters) so as to affect adversely the interests of persons in a State other than that in which the outlet is located or planned . . .". In the enforcement of this provision the Federal Security Administrator *may,* subject to the provisions of Section 3 request the Attorney General to bring suit to enjoin any discharge from such outlet and the court is given the power to enforce its judgment. Here again this bill contains the provision that "Compliance . . . shall not be contingent upon the availability of a Federal grant-in-aid or loan . . ." H.R. 3990 in Section 3 has an escape clause not contained in S. 418. This provides that "Notwithstanding the provisions of subsections (d) and (e) of Section 2, if, after *public hearing*" the board provided for in Section 2 finds that:

> "*it is impossible* or impracticable for any person to comply with the recommendation of a hearing board . . . or with requirements pursuant to regulations . . . because no adequate or practical method of disposal or treatment is known or . . . in the case of municipalities, because of financial inability . . . to construct the necessary treatment works . . . the Federal Security Administrator shall not cause a suit . . . during such period of time, not in excess of five years, as the board conducting the hearing under this section determines is necessary . . ."

Extensions of time beyond the five years or shorter period may be granted by the Administrator after a public hearing before a board established as provided in Section 2 if the person requesting the extension satisfies the board that "he has diligently tried to comply with such recommendation or such requirements."

In order to ascertain the attitudes of the various Directors of Divisions of Sanitary Engineering of the State Departments of Health throughout the Union as to the passage of the bills as originally before the 80th Congress your speaker sent a communication to those Directors under date of February 28, 1947, with the request that he be advised at the earliest practicable date as to their approval or disapproval and that of their Department of the passage of H.R. 123, H.R. 315, H.R. 470 and S. 418. The returns from the 36 States replying are tabulated as follows:

Those in favor of S. 418, H.R. 315 and H.R. 470	24
Those in favor of H.R. 123	3
Those expressing no preference	9
Total	36

State Legislation

During the hearings given by the House Committee on Public Works relative to H.R. 123, H.R. 315 and H.R. 470, testimony was submitted by certain witnesses indicating that the various States had power to control water pollution through the enforcement of their State Laws. As Chairman of the Committee on National Water Policy of the Conference of State Sanitary Engineers, the speaker was asked by a member of the Congressional Committee to submit information concerning the status of State laws on water pollution control, indicating so far as practicable the adequency of existing State laws. In compliance with this request, questionnaires were again sent out by the speaker to the Directors of Divisions of Sanitary Engineering of the State Health Departments with the results as shown in the accompanying table:

An examination of the tables shown will show that 7 of the 46 replies received indicated no State law covering water pollution control. These States were as follows:

Alabama	Nebraska
Delaware	South Carolina
Georgia	Utah
Missouri	

The States having State laws giving a State Agency water pollution control were:

Arizona	Nevada
Arkansas	New Hampshire
Colorado	New Jersey
Connecticut	New York
Florida	North Carolina
Idaho	North Dakota
Illinois	Ohio
Indiana	Oklahoma
Iowa	Oregon
Kansas	Pennsylvania
Kentucky	Rhode Island
Louisiana	South Dakota
Maine	Tennessee
Maryland	Texas
Massachusetts	Vermont
Michigan	Virginia
Minnesota	Washington
Mississippi	West Virginia
Montana	Wyoming

It will be further noted from the above-quoted table that in many of the States having laws there were definite definciencies in these laws making them in many instances not too efficient for the control of water pollution.

The speaker in testifying before the Congressional Committee stated that, while it was his personal opinion that water pollution might well be controlled within the states without the necessity of Federal enforcement or Federal laws, such was not the opinion of the Conference of State Sanitary Engineers and it was the belief of that Conference that a Federal act should be provided. Since the action taken by the Conference of State Sanitary Engineers in Cleveland in 1946 there has been considerable activity in the States and in certain sections of the country. For example, the Interstate Commission on the Delaware River Basin, or "INCODEL," has been very active in promoting projects of water pollution control in the States of Delaware, New Jersey, New York and Pennsylvania; the Interstate Commission on the Potomac River Basin has been active among its members in water pollution control; the Upper Mississippi River Valley Board of Public Health Engineers and the Great Lakes Board of Public Health Engineers and the Tri-State Commission including New York, New Jersey and Connecticut are producing excellent results. These various agencies have been working toward establishing standards in relation to the receiving waters, for the purpose of carrying out joint pollution studies and the pooling of information received. In New England, as a result, in the first instance of the activities of its State Sanitary Engineers associated with departments of public heath or state water commissions the commissioners of these state agencies have negotiated compacts among the New England States and in the year 1947 the Legislatures of Connecticut, Massachusetts, and Rhode Island passed similar legislation in establishing compacts between these States. The compact acts of these states

have been ratified by the 80th Congress and a compact commission was established. This Compact Commission has met, has appointed an advisory committee made up of the engineers employed in the state departments of public health and water commissions in these States and has gone far towards establishing a program of classification of streams as provided in the acts.

To date it has been the writer's opinion that so far as pollution of inland and tital waters in New England is concerned remedial works have been delayed not because of delay by state agencies to enforce the law but until recently because of the lack of mandatory power in these agencies and recently because of the inability to obtain the necessary materials and equipment for the construction of remedial works. This latter condition is particularly pronounced in the State of Massachusetts where the construction of at least three large sewage treatment works has been delayed because of the inability to obtain equipment. Whether or not the local laws will be successful, when equipment is more readily procurable, in reducing water pollution can, of course, only be determined after the performance in these States becomes known. It does seem probable, however, that unless water polution is controlled within the state or by collective action through compacts between two or more states, an act giving power to some Federal agency to control water pollution of interstate waters is inevitable. It would not be fair for one state to clean up its waters and then be subject to pouultion from another state or to be called upon to clean up its waters when a state lower down on a stream or tidal water permits uncontrolled pollution of its waters. Such conditions permit of unfair competition in industrial and recreational development. The problem of water pollution control also will be affected by the extent of knowledge available as to approprite treatment methods, more especially of certain industrial wastes. The speaker is pleased to be able to report that through the facilities of its Lawrence Experiment Station which has been functioning in matters of treatment of industrial wastes, sewages and waters since 1887, much progress has been made especially during the last year as to the proper treatment of certain industrial wastes formerly believed to be impossible of adequate treatment. The research work of our experiment station is available to other States and to industry in general and the research works of other laboratories also should be made available as it is very important that such knowledge should be pooled so as to prevent duplication of research work. Certain manufacturer's associations are assisting in this regard by making valuable information available and in this connection the work of the National Council for Stream Improvement of the Pulp, Paper and Paperboard Industries, Inc., should be mentioned.

Specification for Chemical Composition of Process Water for Manufacture of Groundwood Papers*

TAPPI Tentative Standard E 602-s-48

This specification should be considered only as a guide in detrmining the quality of water to be used in the manufacture of groundwood papers.

Definition

By groundwood papers are meant coarse papers composed primarily of groundwood fibers such as are used for news, telephone directories, cheaper grades of catalogues, pulp magazines, etc.

Limitation

This specification does not apply to process water for groundwood papers made from southern pine, nor to process water to be used for groundwood *pulp* manu-

Chemical Composition

The water shall not contain impurities in excess of the amounts given below, expressed in parts per million and in terms of the substances indicated:

Substance	Maximum, *p.p.m.*
Turbidity* as SiO_2	50
Color in platinum units	30
Total hardness as $CaCO_3$	200
Alkalinity to methyl orange as $CaCO_3$	150
Iron as Fe	0.3
Manganese as Mn	0.1
Silica (soluble) as SiO_2	50
Total dissolved solids	500
Free carbon dioxide as CO_2	10
Chlorides as Cl	75

*Materials causing turbidity shall not be gritty.

*This specification has been approved as a tentative standard by the Water Committee. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y.

Notes

1. Chlorides are limited to 75 p.p.m. because chloride concentrations in excess of this amount tend to promote corrosion of metal parts in the manufacturing system.

2. A limit for organic material is not included, since the nature of the organic material is a controlling factor. For some types a much higher limit may be allowable than for others. The limit on color has a limiting effect on some of the more objectionable types of soluble organic matter. In general, organic materials should be kept as low as possible in process water.

Reference

TAPPI Special Report No. 373 "Process Water Used in the Manufacture of Papers Containing Groundwood," issued April 22, 1947 as a confidential report by the Technical Association of the Pulp and Paper Industry.

TAPPI Notes

Cecil H. Baldwin is now chemist in the control department of the Scott Paper Company, Chester, Pa. Mr. Baldwin has been with the Coos Bay Pulp Corporation, Anacortes, Wash., a Scott subsidiary.

Marcus E. Sanford has been transferred from the Sumner, Wash., mill to the Antioch, Calif., mill of Fibreboard Products, Inc.

Walter E. Riley, formerly of the Howard Smith Paper Mills, is now engineer for the St. John Sulphite Company, Ltd., St. John, N. B.

White Water Treatment—An Industrial Waste Problem*

By Robert T. Sheen[1]

Abstract

An outline of the problems imposed by impending legislation is given and the cause of pollution discussed. There are several methods which are being used successfully by the paper industry for treating whitewater and the principles of their action are described.

Water is one of the largest raw materials used in the manufacture of paper and pulp *(1)*. It is early recognized when planning a paper or pulp mill that water will be required in considerable quantity and of certain quality in accordance with the type of paper to be manufactured. Too often in the past the inclination has been to regard the excess water over that actually required as moisture in the sheet or evaporated from the sheet as a waste to be put down the nearest drain or dumped in the nearest stream with an "out of sight—out of mind" attitude. It has been only human from long force of habit to "pull the chain" and then forget about it.

Fortunately there has been an increasing realization since sometime before the war that our responsibility to society goes further than simply that and that something more is necessary. The effects of pollution have become more significant than ever with increased publicity and public enlightenment focusing public attention on this subject. State and local laws have been passed with threats of federal legislation dealing with the abatement of stream pollution. The paper industry has realized its responsibility and is doing something about it through cooperation by the formation of the National Council for Stream Improvement, organized in 1943 for the purpose of coordinating industry wide activity and for the promotion of greater cooperation between individual members in attempting to solve a common problem. Other industries have formed similar groups for studies of the problems peculiar to their processes.

In a number of States it is now not possible to build a plant on a water shed without including in the plant the proper facilities for disposal of the waste. The location of a mill may today be determined by the possibility of proper treatment of the wastes from that mill and the ability to discharge such treated wastes to a waterway. Different standards have been established by the state authorities depending on the proximity of the waterway to the final outfall to the ocean and on the degree of pollution that exists considering the total flow of water. For example, there is an interstate sanitary commission established by New York, New Jersey and Connecticut that governs the pollution of New York Harbor and adjacent waters. This compact was adopted by the States and approved by Congress and authority is vested in this commission to define and enforce standards of abatement. There is another form of a commission for the Delaware River between Delaware, Pennsylvania, New Jersey, and New York and known as Incodel. In this case the enforcement of the standards rests with the individual states.

Unfortunately there is no cure all for any waste disposal problem. Each problem is an individual one and must be studied and considered as such and should furthermore be recognized as a necessary plant process and given the same study and research accorded actual production methods. Recirculation of waters must be considered not only from the standpoint of minimizing the volume of final waste to be treated but also to reduce the quantity of raw water that first must be treated to make it suitable for the process and to effect savings of materials by such recirculation. While the recovery of valuable products from the water is desirable, such recovery can seldom be expected to pay for the process and waste treatment must be considered by management as a direct charge to manufacturing with any recovery

* Presented at a meeting of the Delaware Valley Section of the Technical Association of the Pulp and Paper Industry.

[1] Member TAPPI; Consulting Chemical Engineer, Philadelphia, Pa.

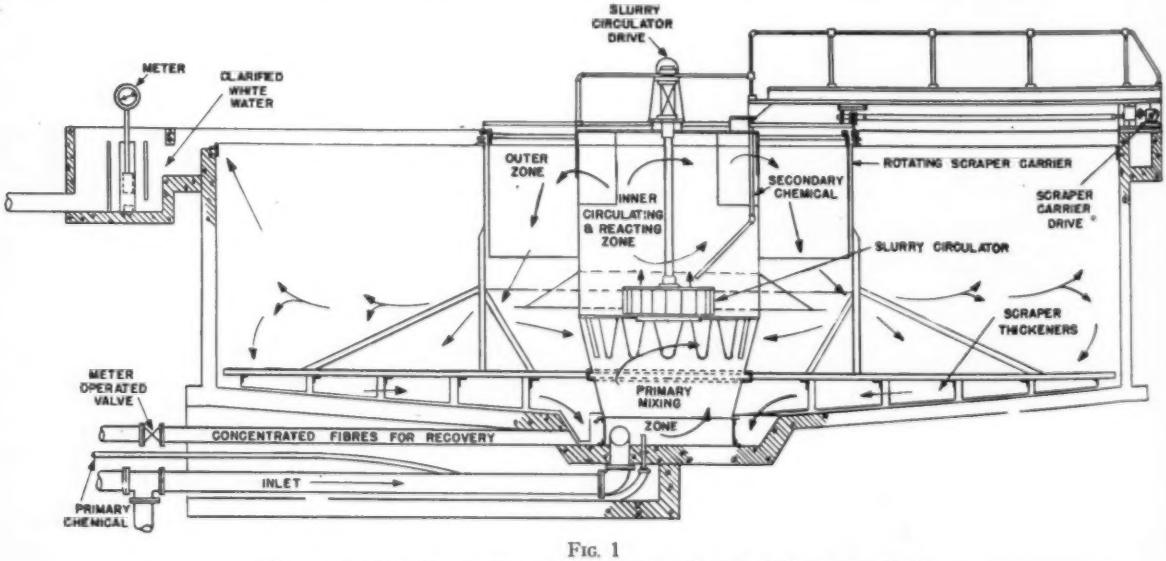
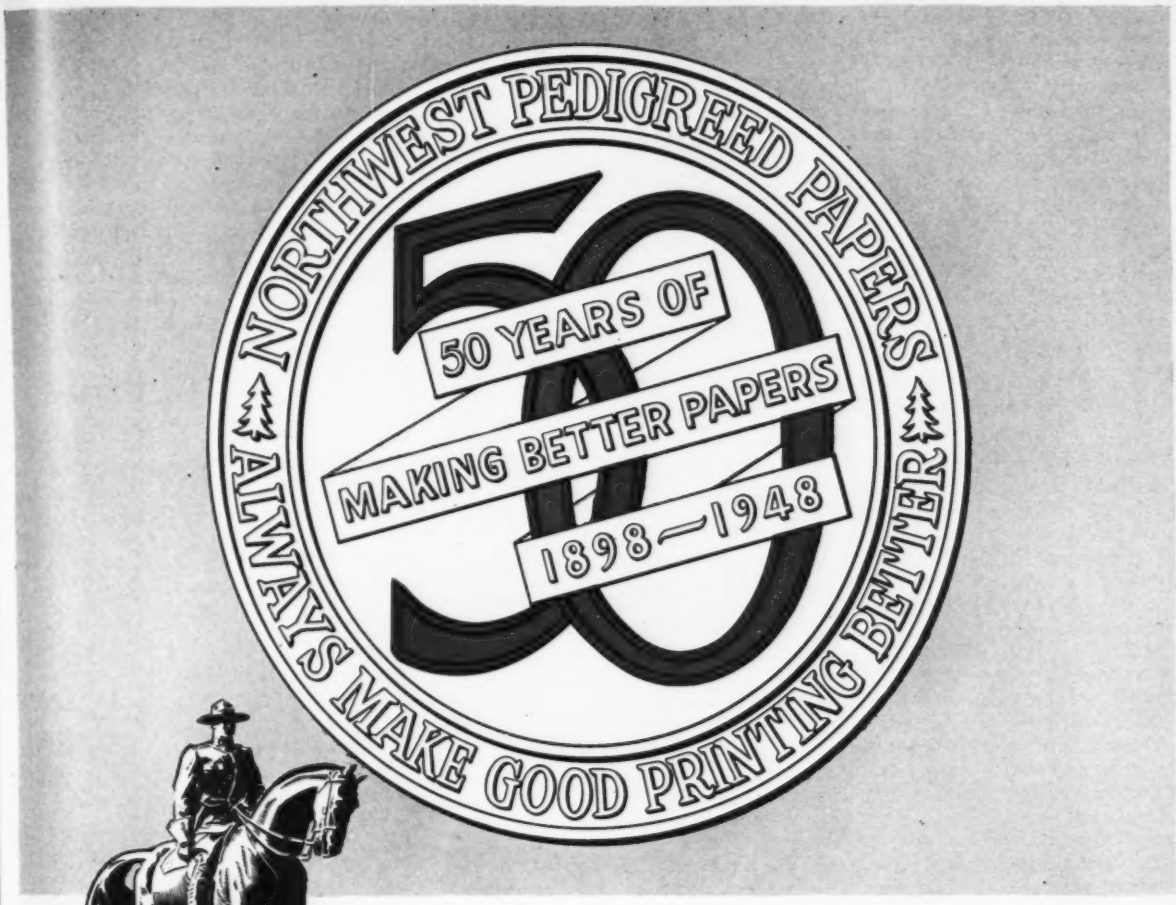


FIG. 1

Clarator for clarification of paper mill white waters. Courtesy Infilco, Incorporated.



In the course of Northwest's far-flung operations through its distributing agencies, this fifty year old organization is called upon to meet many and exacting printing paper needs. Geographical preferences, equipment limitations, unusual adaptations, extreme requirements of one kind or another, rigid maintenance of standards—all these are met and satisfied as a part of the daily chore. It takes some doing, but a wealth of experience and realistic understanding of the printers' needs is the answer to Northwest's being truly the "printers' paper maker."

NORTHWEST

Pedigreed Papers

ALWAYS MAKE GOOD PRINTING BETTER

THE NORTHWEST PAPER COMPANY . . . CLOQUET, MINNESOTA

of fibers or other valuable products to be put on the credit side of the ledger. The values of recirculation where possible are in the recovery of fiber, the recovery of heat in the system, the savings of chemicals in raw water treatment and treatment costs in final disposal. Where the raw supply must be heated in the process, savings of heat alone can be an appreciable item and, for example was found to be $20.00 to $27.00 per day in one mill surveyed by the author, this mill having a total capacity of 150 tons of board per day. Recovery of valuable products does not always in itself reduce the waste load. Recovery processes will sometimes produce new waste that still require treatment and the final solution of the problem must be directed to minimizing the final pollution load discharged to the receiving water way.

Definition of a Pollution Load

What constitutes pollution? Pollution is caused by the various impurities present, suspended dissolved or colloidal, acidic, alkaline, or toxic that lower the utility of the water for any subsequent use to which this water may be placed or that tend to reduce the dissolved oxygen content of the receiving water to the point where fish life or any other aquatic life is affected. If a waste is to be examined for its pollution load therefore there are certain factors in the analysis which must be determined. The waste should be examined for the solids present, classifying these solids as dissolved and suspended, and each of these classifications in turn into volatile and nonvolatile solids. Volatile solids will consist essentially of the organic materials present. Fiber, for example, will be found almost entirely as suspended volatile solids. Certain hemicelluloses will be soluble and many white waters will show the presence of considerable dissolved volatile solids. The solids analysis is an excellent indication of the form in which various solids are present and is a clue to the methods of treatment that will prove effective.

Acidity and alkalinity must be considered. For example, certain parchment process wastes are strongly acid and must be neutralized before discharge. The acid content of such waste could readily affect the entire receiving stream making the stream acid in character. There are a number of alkaline wastes from paper mills. Excess alkalinity must likewise be neutralized. Many State laws will require that the pH value of the final waste discharge be not less than 4.0 nor more than about 9.0. pH therefore, must be considered along with the amount of acidity or alkalinity present. Color wastes are extremely objectionable for obvious

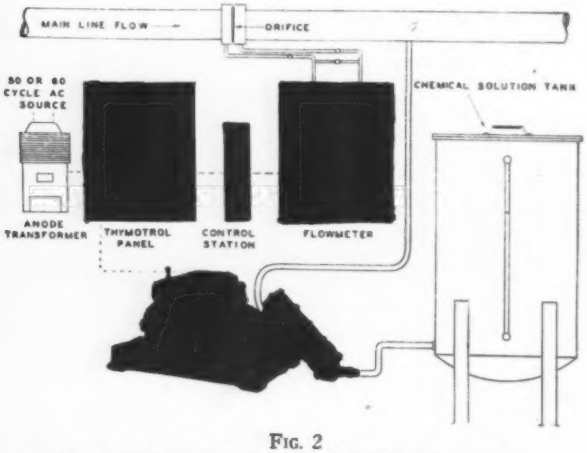


FIG. 2
Proportional Feed Diagram with Controlled Volume Pump.

reasons. Colors may be due to fillers or to dyes. Toxic materials; for example hypochlorite, phenol, mercury compounds etc., are undesirable in a final waste. Phenol is particularly undesirable as when phenol as chlorinated, as it would be in a municipal water treatment plant, chlorphenols are formed. Chlorphenol can be detected by taste in concentrations as low as 5 parts per billion.

The yardstick most commonly used to evaluate the total pollution load is the biochemical oxygen demand of the waste, known as the B.O.D. This is a measure of the ability of the waste to remove oxygen from water by biochemical action. Organic matter tends to degradate to the final end products of water and carbon dioxide. This degradation or decomposition is brought about by the action of oxygen and bacteria. When this action takes place in the presence of air, or in the presence of dissolved oxygen in a stream the action is known as aerobic decomposition. If insufficient oxygen is present in the free form, then it may be taken from other forms such as sulphate resulting in the formation of hydrogen sulphide. When a stream is depleted of its oxygen to the point where such anaerobic action takes place, a septic condition results with the evolution of odors and the stream is made totally unfit for consumption, further industrial use or recreation.

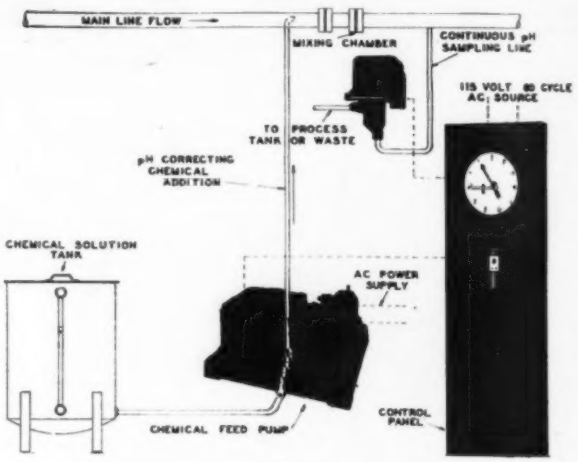
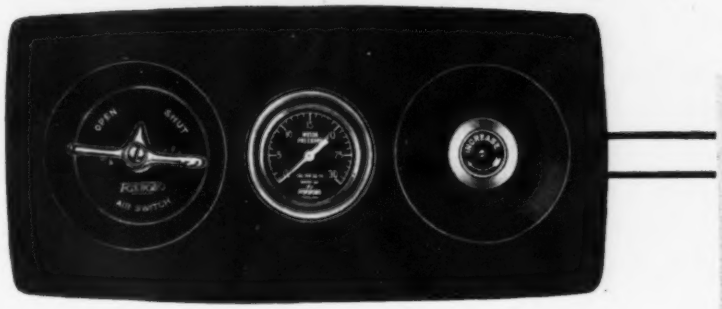


FIG. 3
Automatic pH Control System with Constant Main Line Rate of Flow. The pH meter through the controller automatically sets the length of stroke of the chemical pump to continuously deliver the quantity of pH correcting chemical as required by the system. Capacity of the pump is automatically controlled from 0 to maximum by the pH controller.

It has been determined that the raw sewage from one person is equivalent to average of 1/6 of a pound of B.O.D. per day. In other words, a town of 6,000 population would normally discharge 1,000 pounds of B.O.D. per day or 1,000 pounds of oxygen demand per day on a stream. It is a function of sewage treatment to remove this demand before the waste is finally discharged to the stream. Industrial wastes are likewise measured by their B.O.D. and the industrial pollution load of an individual plant may be compared to a population equivalent of a town. In other words a plant discharging 1.000 pounds of B.O.D. per day is said to have a population equivalent of 6,000. The B.O.D. value of the waste is therefore a convenient yardstick for evaluation or comparison with other wastes and for definition of standards that must be met by a waste before discharge. While the B.O.D. is considered to be the yardstick, the other factors enumerated are also frequently specified and limited in the definition of what will constitute a satisfactory waste for final discharge.

Recirculation is of considerable value in minimizing

Avoid mad scrambling when flow runs wild—



. . . with this New Remote Valve Control System

Now — those big, inaccessible valves throughout your plant can all be remotely controlled from a central panel. No more rushing around to adjust them by hand . . . now it's simple, fast, far more accurate and efficient. And the operation can be made automatic, if you wish, with the use of Foxboro Model 40 Controllers.

The system for manual operation consists of a valve of your choice, equipped with the new Foxboro *pneumatic* or *hydraulic* positive-positioning cylinder type operator, plus the standard Foxboro Remote Control Panel pictured above. Note the switch for fast open-shut operation, the gauge which shows valve opening, and the control knob for the precise adjustment of this valve opening.

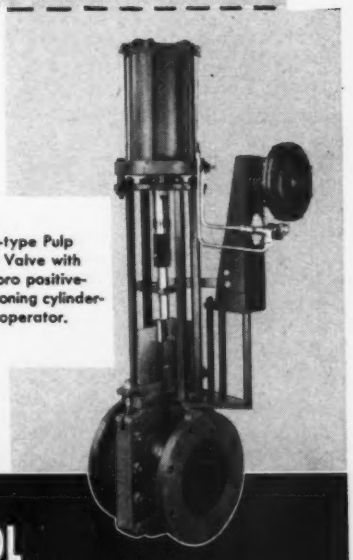
A VALVE FOR ANY FLUID-FLOW

Typical of the valves supplied by Foxboro for this service is the Saunders Patent Valve shown at top — recommended for corrosive fluids or those containing fibrous or mineral solids in suspension.

The gate-type pulp stock valve shown at the bottom is used for service involving temperatures and line sizes beyond the practical limits of other valve types.

Here's a new system that simplifies valve operation . . . centralizes it . . . and eliminates a lot of confusion at the same time. Write for complete details. **The Foxboro Company, 114 Neponset Ave., Foxboro, Mass., U. S. A.**

Saunders Patent Valve with Foxboro positive-positioning cylinder-type operator.



Gate-type Pulp Stock Valve with Foxboro positive-positioning cylinder-type operator.

FOXBORO FLOW CONTROL

REG. U. S. PAT. OFF.

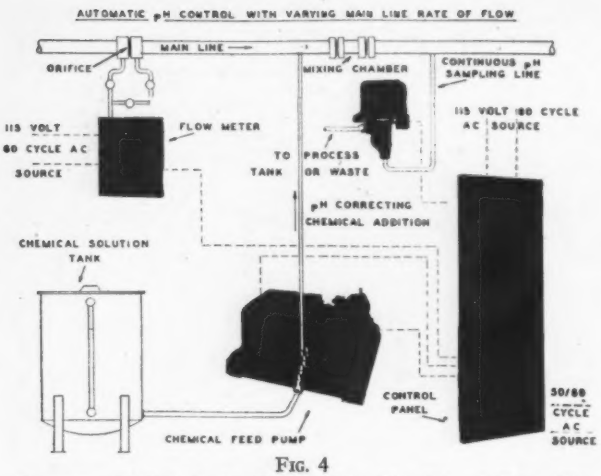


FIG. 4

Automatic pH Control with Varying Main Line Rate of Flow. The capacity of the pump is automatically compensated for two variables. Pump motor speed is directly proportional to rate of main line flow and length of stroke of the pump is automatically adjusted by pH controller.

the quantities of makeup water required from a raw water treatment system and at the same time minimizing the amount of discharge. Disposal of the waste water from a paper mill is therefore intimately related to a study of possible recirculation within the mill. By use of savealls within the system, and separation of fibers from water, the water is frequently made suitable for recirculation on showers and to headboxes and for makeup to beaters. Recirculation is not without its problems. Increased quantities of chemicals may be required within the system such as chlorine, sodium pentachlorphenate, or mercury compounds to prevent formation of slime. There is a certain limitation to recirculation as a bleed from the system is frequently required to affect removal of some solids. If such solids were not removed, continued concentration would establish an equilibrium between the solids in the water and the solids retained in the paper sheet that might readily be above desired limits for the quality of the sheet being manufactured. While recirculation is desirable, its limitations must also be recognized.

Methods of Industrial Waste Treatment

To understand the treatment and handling of white water and white water problems, it is well to consider a broad outline of the unit processes of treatment for any liquid industrial waste. Any such methods may first be classified into three broad divisions; mechanical, chemical, and biological. Mechanical methods include straining, sedimentation, filtration, centrifuging, drying, incineration, flotation, evaporation, and absorption. Chemical methods include neutralization, oxidation and reduction, floculation, and precipitation. Biological methods employ biological life cycles to effect rapid degradation of organic matter and biological processes are in turn divided into two broad groups; aerobic processes which are those that take place in the presence of air and anaerobic processes, those that take place in the absence of air. Aerobic processes for example include trickling filters, contact beds, and activated sludge. Treatment in septic tanks, Imhoff tanks, or sludge digestors are typical anaerobic processes.

All methods of waste disposal treatment involve various combinations of these unit treatment processes and it is necessary in each case to determine what combination of these will give the most satisfactory and economical answer to a given waste disposal problem.

Methods of White Water Treatment

The use of screens in treating white waters is perhaps the oldest of the methods employed to separate fibers. Vibrating and rotary screens are commonly used. Sloping screens known as hillsides find frequent application. A later development was the rotating screen known as a saveall where the rate of rotation was sufficiently slow so that fiber removed formed a mat on the screen and aided in filtration of further fiber from the water.

Sedimentation in clarifiers or in ponds or lagoons is commonly employed. Velocity through such clarifiers must be sufficiently low to permit a separation of the fibers from the conveying water by subsidence. The next logical step is a combination of chemical and mechanical treatment, coagulation of the fibers and suspended solids by the use of a chemical coagulant such as alum. This requires a flash mixer, floculator, and a sedimentation tank. Flash mixers are normally designed for retention of 1 to 3 minutes, floculators from 10 to 30 minutes, and clarifiers from 2 to 6 hours. The clarifiers are frequently fitted with sludge collecting devices to gather together the settled sludge and remove it continuously or semicontinuously from the clarifier. Frequently there is sufficient fiber in the sludge to justify recovery. In other cases the fiber is so short or is sufficiently mixed with other impurities as to make it worthless and the sludge must then be dewatered by filtration, centrifuge, or sludge drying beds before final disposal.

Upward flow clarifiers were introduced as water treating units before the war and many hundreds of these units were installed during the war in many water treating plants and have proven quite successful not only as cold process softeners but also as clarification units. Several of these have been offered for use in treatment

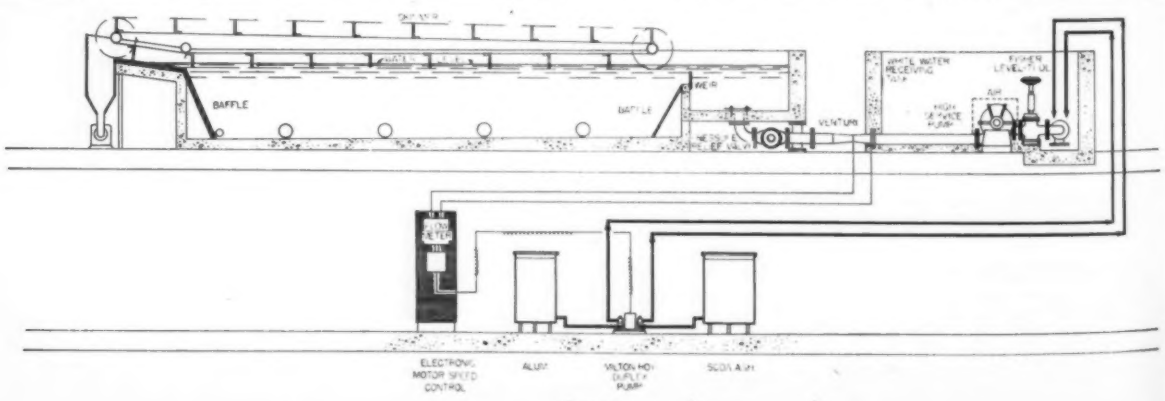
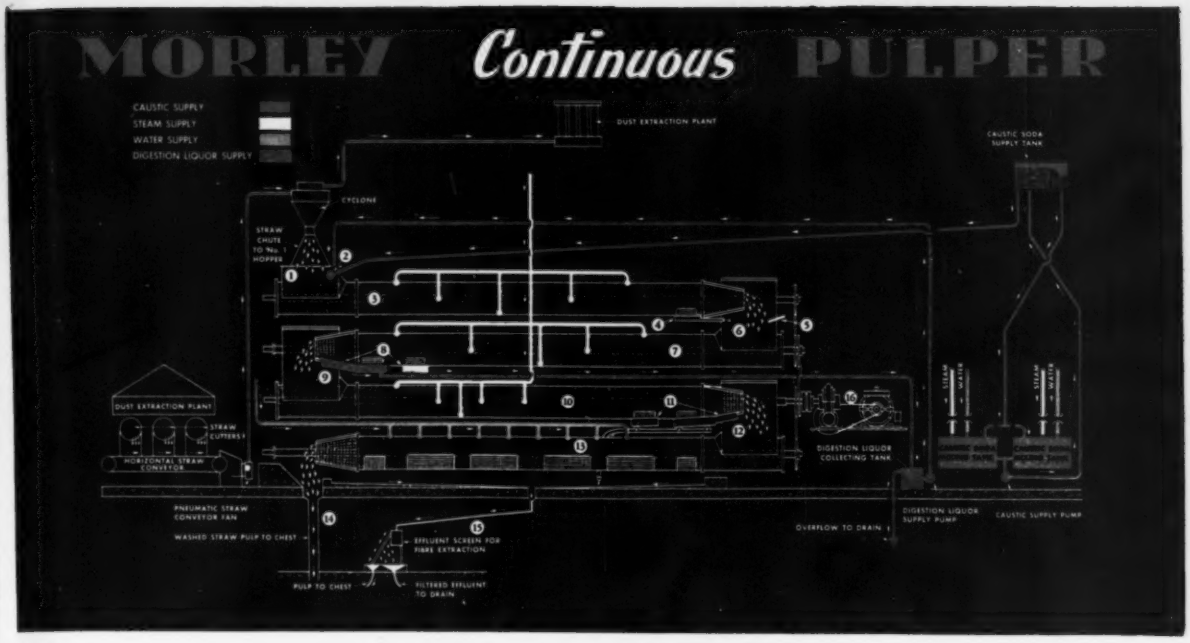


FIG. 5

Proportional Feed System to a Flotation Type of Save All for Treatment of Paper Mill White Water.

MORLEY *Continuous* PULPER



PATENTED AND PATENTS APPLIED FOR

for continuous pulping of Cereal Straws, Bagasse, and the like

The MORLEY CONTINUOUS PROCESS AND APPARATUS, now in mill operation for five years, is a proven efficient method, operating at atmospheric pressure only. It economically and continuously processes cereal straws and other cellulosic materials to pulp for the ultimate manufacture of quality paper and/or Board, for example: .009 Corrugating, Tube Stock, Wall Board, and many grades requiring rigid characteristics.

- **Continuous Feed and Digestion at high density.**
- **Operates at atmospheric pressure and low temperature.**
- **For .009 corrugating and board grades, average yields 69-70% based on straw, as used, averaging 12% moisture.**
- **Low steam consumption.**
- **Low overall power consumption.**
- **Digestion period is approximately 20 minutes for .009 corrugating or board grades. This insures minimum degradation of finer fibres, and reduces shrinkage.**
- **Space required for one 50-ton Unit is 7,000 cubic feet, a saving of approximately 65% over conventional equipment.**

- ***Write for Morley Brochure***

KEY TO FLOW DIAGRAM:

1 No. 1 Tube Hopper
2 Caustic Soda Orifice metering system
3 No. 1 Tube Impregnator
4 Screen Plate and Drainage Line for Digestion Liquor to No. 2 Tube
5 Recording Thermometer
6 No. 2 Tube Hopper
7 No. 2 Tube Digester
8 Screen Plates and Drainage Line for Digestion Liquor to Collecting Tank
9 No. 3 Tube Hopper
10 No. 3 Tube Digester
11 Screen Plates and Drainage Line for Spent Liquor to Drain
12 No. 4 Tube Hopper
13 No. 4 Tube Washer
14 Washed Straw Pulp to Chest
15 Spent Liquor Supply to Effluent Screen
16 Motor, Texrope, and Reduction Gear Drives

PAPER and INDUSTRIAL APPLIANCES, INC.
122 EAST 42nd STREET NEW YORK, N. Y.

of white waters *(2, 3)*. The application of the Spaulding precipitator is discussed by Applebaum and Rhinehart *(4)* and a large installation of the Spaulding at the Southland Paper Mills was recently described by Carpenter and Porter *(5)*. In this installation the raw white water to the Spaulding contains 2 to 3 pounds of fiber per thousand gallons. The effluent is reported as having 0.1 pound per thousand gallons or less. The wood fiber forms its own floculating agent and no further coagulant is required in this system in that particular case. Varying temperature of water to the treatment unit has caused difficulty because of convection currents and some form of temperature control appears desirable. This plant is designed to treat 1,180 gallons per minute. The precipitation basis has a retention of 120 minutes and a rise rate in the clear water section of 1.03 gallons per square foot per minute. Sludge is removed containing 50 pounds of fiber per 1,000 gallons and operating costs including chlorination, labor, and power has been found to be 0.51 cents per thousand gallon.

Another form of clarifier on which installations are now being made is a modified form of the Accelator known as the Clarator (Fig. 1.) The conventional accelator design has been modified to include a sludge collection mechanism on the bottom of the tank to give a thickened sludge. Other upflow clarifiers that may have an application to white water treatment are the Clarifloculator and the Reactivator. Chemical feeds may or may not be required with such units depending on the nature of the suspended solids present. Where fibers alone constitute the suspended solids it may be possible to operate without the assistance of a coagulant. Where fillers or colloidal solids are present, a coagulant with improved removal of such solids can effect further reduction of the B.O.D.

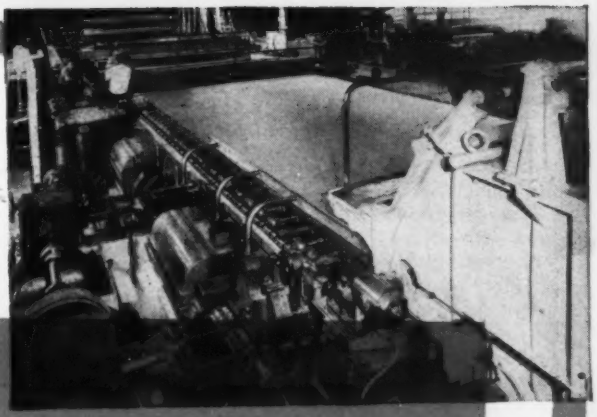
There has been considerable interest in the application of flotation units to the removal of fiber from white water. There are two common designs in use, the Adka and the Sveen-Pederson. In the Adka design, the white water is thoroughly aerated and then mixed with flotation chemicals such as alum, rosin, or certain organics. Activated silica is finding wide application in this process as a coagulant aid. The white water is saturated with air at atmospheric pressure and is then drawn by vacuum into a large mushroom shaped tank and held under a vacuum of approximately 8 feet. The dissolved air then leaves solution and the small bubbles attach themselves to the flocculated particles of fiber rising to the top of the liquid. The floated fiber is then removed by a skimmer. The Sveen-Pederson unit employs a similar principal except that air is mixed with the white water under pressure and at a pressure that can be varied. Chemicals are added to the white water and the pressure is then released in an open tank to atmospheric pressure and the dissolved air again leaves solution and causes flotation of fiber and suspended solids. Such flotation units may be used to advantage where the suspended solids in the white water consist primarily of fiber and of solids that can be readily floated. Where there is any appreciable amount of filler present or heavier materials, a flotation process may fail to remove a sufficiently high portion of the solids. There are many of these processes operating to deliver water with a fiber content of less than 0.1 pound per thousand gallon. The retention time in the flotation system is only 10 to 15 minutes so that this system, where it can be applied, offers considerable economy in space requirement and should prove less expensive than the larger sedimentation systems.

The chemical feed to such systems has frequently been by hit or miss methods and the importance of a proper chemical feed has not always been appreciated. Various chemical coagulants will give best results at certain definite pH values, this pH value depending on other solids present in the system. If the quantity of alum fed is too low, or if proper pH is not maintained, improper floculation will result with poor flotation or poor coagulation as the case may be. The quantity of coagulant should therefore be fed proportionately to the quantity of water to be treated and suitable proportioning devices installed to assure this constancy of a definite ratio of chemical feed to water treated. Figure 2 shows a controlled volume pump that can be run to obtain a proportional chemical feed. The speed of this metering pump is in direct proportion to rate of flow of water in the line as registered by the meter, controlled electronically and assuring a constant proportionality of chemical feed, to water flow *(6)*.

FIG. 6

View of Assembled Biological Pilot Plant for investigation of B.O.D. by treatment of washer and digester liquors on high rate trickling filters and clarifiers. Surge tank to left, clarifier in center, and two trickling filters, first between surge tank and clarifier and second to right of clarifier.

Interesting facts about PAPER



In 1798 Louis Robert invented the endless wire screen which is the basis of modern paper making machines. Robert sold his idea to the Fourdrinier brothers, two wealthy Englishmen. They went bankrupt developing it, but today these great machines, used in the paper industry throughout the world, bear their name.

INTERESTING FACTS ABOUT CHRYSOIDINE Y DUSTLESS

CHRYSOIDINE Y DUSTLESS is a popular basic orange, extensively used in coloring kraft, tissue, boxboard, poster, news and catalog papers. It dyes both sized and unsized papers and gives excellent results when used on unbleached fibers.

Your Calco representative will be glad to supply full information on CHRYSOIDINE Y DUSTLESS and the many other colors in the Calco line.

Calco
HELLER & MERZ DEPARTMENT

CALCO CHEMICAL DIVISION
Heller & Merz Department
AMERICAN CYANAMID COMPANY
Bound Brook, New Jersey

New York • Chicago • Boston • Philadelphia • Charlotte • Providence

Figure 3 illustrates an application to obtain constant pH value with constant flow. In this case pH value of the water following the addition of chemical controls the length of the stroke to a motorized stroke adjustment on a chemical feed pump. Where the flow is variable and pH value is to be controlled, the two variables can be superimposed on one chemical feed pump as shown in Fig. 4. In this installation, the pump motor speed is proportional to water flow and the length of the stroke adjusted by the controlled pH value properly compensating for each variable and assuring a straight line control. If the pH controller had to follow variations in water flow there would be considerable lag in the system. Such a lag is eliminated by the use of the two controls on the one chemical feed unit. Fig. 5 shows an application of this proportional feed control to an installation feeding alum and soda ash proportionately to the water being fed to the flotation saveall.

The unit processes discussed so far are mechanical or chemical processes. Biological processes must be sometimes considered. After removal of the suspended solids by mechanical and chemical means, there frequently will be present dissolved organic solids, principally hemicelluloses that must be removed to lower the final B.O.D. of the waste. Other solubles that may be present will include lignins, and in the case of

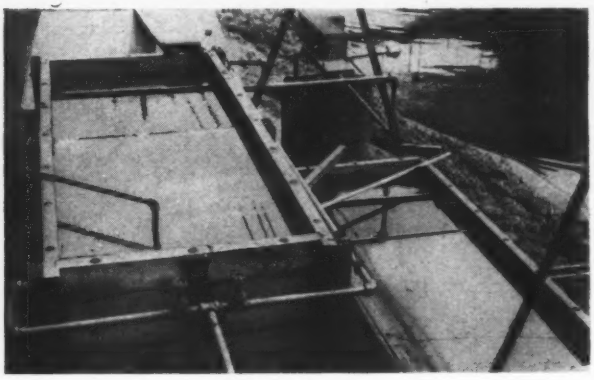


FIG. 7
Clarifiers in Foreground, Secondary Filter in Background.

groundwood white water; pentose and hexose sugars, lignins, acetic and formic acids. Biological methods may be required for the removal of these pollutants The so-called trickling filters are perhaps best adapted for the treatment of such industrial waste as these units are less susceptible to shocks and will take larger variation of load both in quantity and characteristics than will any other form of biological treatment. It is advisable to have some forms of ammonia and phosphate present to serve as additional food for the biological life. A trickling filter consists essentially of a bed of rock or other contact medium from 3 to 10 feet in depth and with a mechanism for distributing the liquid waste over the top of the bed allowing it to percolate over the rock, and collecting by means of a suitable under drain system. A biological life is developed on the surface of the rock that feeds on the organic matter present. A single pass of waste over the rock or a system with recirculation may be employed. B.O.D. will be removed from waste at rates as low as 0.15 pound of B.O.D. per cubic yard of rock per day to as high as 30 pounds of B.O.D. per cubic yard of rock per day.

With a possibility of a 200 to 1 range in the activity of biological life depending on the nature of the solids,

FIG. 8
Closeup of top of Trickling Filter.

the design of the system, rates of recirculation, etc., it is most important that a definite knowledge of reaction rate be available for the individual waste or that suitable pilot plant tests be made to determine the rate at which B.O.D. will be removed by such trickling filters. Figures 6 to 8 illustrate a typical pilot plant recently installed to determine the rate of B.O.D. reduction by biological means on a rag cooker and rag washer at a paper mill. From data obtained on such pilot plant installations, complete treatment plants then can be intelligently designed.

Activated sludge should only be considered in conjunction with trickling filters and to follow trickling filter as a secondary method. In this case the shocks and irregularities of feed are taken by the trickling filter and the remaining biological work is by the activated sludge.

The fact that each individual plant presents an individual problem must never be overlooked in considering white water treatment for the solution of an industrial waste problem. A proper investigation and study of the individual problem will invariably prove most worthwhile in assuring a satisfactory and permanent solution that will not only discharge the obligation of the plant to its neighbors and to state authorities but also prove both possible and economical to operate as a portion of the complete paper mills manufacturing process.

Literature Cited

1. Sheen, R. T. and Wilson, H. M., Water: A Raw Material for the Paper Industry, *Paper Ind.* (June, July, 1938).
2. Brookover, Thomas E., A Paper Board Mill's Attack on Stream Pollution. *Tech. Assoc. Papers* 28, 76 (1945).
3. Lasseter, P. P., and Queern, B. J., Clariflocculation of Mill Waters. *Tech. Assoc. Papers* 28, 113 (1945).
4. Applebaum, S. B., and Rhinehart, J. R., Waste Water and Fiber Recovery with Reclaimers of the "Precipitator" Type. *Tech. Assoc. Papers* 28, 125 (1945).
5. Carpenter, Charles, and Porter, Cover C., Waste Water Utilization by Clarification. *Tech. Assoc. Papers* 28, 147 (1945).
6. Sheen, Robert T., Electronics in Automatic Chemical Feed Systems. *Trans. A. I. Ch. E.* 42, 4, 725-39 (August 25, 1946).

• Reduce Operating Costs

OUTSTANDING

SLIME CONTROL

WITH A PROVEN PRODUCT

REPRESENTATIVES IN MOST COUNTRIES

Write Today

BUCKMAN LABORATORIES, INC.

MEMPHIS 8, TENNESSEE

Education for the Paper Industry

By S. V. Ballou[1] and B. E. Lauer[2]

Abstract

Industrial vocational training, long recognized as of value to industry, experienced a tremendous increase during World War II, particularly as a result of the Training Withing Industry program. In the field of the manufacture of pulp and paper, training programs exist in private institutions, in publicly supported institutions, and in industry itself. The job ahead seems to consist of increasing the number of participants in training programs, of improving the quality of instruction, and of developing a comprehensive, well-coordinated program for the entire industry.

It is highly important that the industrial executive realize what specific and tangible values will accrue from an educational program designed to train or educate the working force of his plant or factory. Fortunately, these values are no longer speculative but are proven. An analysis of the gains made by workers through training shows that they have increased their self-confidence in handling work assignments, that they have improved their powers of observation, and that they have developed a much better perspective of the process and a proper concept of the continuity and inter-relationship of the individual operations *(1)*. Well trained workers are an economic asset to the organization by which they are employed in that they qualify themselves for promotion and are of value as replacements when vacancies occur.

An educational program in industry serves as a common meeting ground between labor and management and stimulates healthy competition between workers. The teacher-student relationship develops confidence and promotes better understanding of common problems. Thus a more stable labor force is provided, employer-employee relationships are made more harmonious, and output is increased both in quantity and quality.

Proof that these results are realized is obtained from the reports of the success of the widespread training programs inaugurated during World War II. In May 1943, the House Appropriations Committee requested a report from the Training Within Industry Service enumerating the results of its program. Over six hundred voluntary statements formed the basis of the first summary of the results obtained. This summary is given in Table I *(2)*.

TABLE I.—SUMMARY OF RESULTS OF TWI PROGRAM
REPORT OF MAY, 1943

Kind of Result	Percentage Improvement Reported: Under 25%	25-49 %	50-74%	75% and over
	Percentage of Plants Reporting Results			
Production increased	63	16	1	20
Training time reduced.....	52	25	7	16
Manpower saved	89	9	1	1
Scrap loss reduced.....	89	5	5	1

The highly favorable reaction to the benefits to be derived from the Training Within Industry program was amplified in a series of subsequent tabulations as follows *(2)*:

TABLE II.—SUMMARY OF RESULTS OF TWI PROGRAM

	Percentage of Plants Reporting an Improvement of 25% and Over						
	May 1943	Sept. 1943	Feb. 1944	Nov. 1944	April 1945	July 1945	Sept. 1945
Production increased ..	37	30	62	76	64	63	86
Training time reduced	48	69	79	92	96	95	100
Manpower saved	11	39	47	73	84	74	88
Scrap loss reduced....	11	11	53	20	61	66	55
Grievances reduced ...	(not reported)		55	65	96	100	100

There is, then, adequate proof of the fact that training within industry is a program which yields tangible values to the company which takes the time to institute and promote such a program.

The significant and financial values resultant from such a program, when it is properly conceived and adequately supported, were dramatically summed up in the comments of the president of a large industrial organization involved in the TWI program *(2)*.

> "Under no circumstances do I want you to make public my name or that of my company. While I want you to know what this program has done for us, still I must not have it known to some of my stockholders, who would immediately ask "What have you, Mr. President, been doing all these years to overlook such a possible reduction in expenses which would have meant increased dividends to us?"

Contributions By the Industry

The importance of education to the pulp and paper industry was given recognition during World War I. At that time (September 10, 1918) the Technical Association of the Pulp and Paper Industry organized the Joint Vocational Education Committee of the Pulp and Paper Industry of Canada and the United States *(3)*.

The neglect of technical training and human interest in favor of mechanical perfection was recognized as causing a serious condtion, and the major aim of the new committee was to provide accumulated scientific knowledge in such a form as to stimulate a desire for self-improvement on the part of workmen, foremen, and supervisors.

From 1921 to 1925 a five-volume textbook, *The Manufacture of Pulp and Paper,* was published *(3)*. Volumes III, IV, and V, which deal with pulp and paper mill practices have since been revised twice, the first time from 1927 to 1929 and the second time ten years later. Volumes I and II, dealing in elementary mathematics, physics and chemistry, have required no revision. Through 1943, a total of 36,609 textbooks had been sold. This indicates the value and continued interest in the educational value of the textbooks which were prepared.

This set of books has been the basis of courses offered by the Massachusetts Division of University Extension, International Correspondence Schools, the Wisconsin State Board of Education, the University of Maine, the New York State College of Forestry at Syracuse, the Technical and Paper School at Three Rivers, Quebec, and in other schools, both in this country and abroad.

The vitalizing effect of the program initiated by this committee on the industry is adequately demonstrated by this wholehearted acceptance of the results of its activities. Subsequent developments have also demon-

[1] Advisory Member, Vocational Training Committee, TAPPI; Institute and Graduate Fellow in Department of Education, University of Colorado, Boulder, Col.

[2] Chairman, Vocational Training Committee, TAPPI; Professor of Chemical Engineering, University of Colorado, Boulder, Col.

what the paperboard industry sees in

CMC

HERCULES

A YEAR AGO we asked the industry, "What do you see in CMC?" Today, paperboard manufacturers—among the first to explore the possibilities of this new chemical material and to recognize its value—have found that:

Hercules® CMC gives paperboard added internal and surface strength!

Hercules CMC gives paperboard added resistance to penetration by oils and waxes which, in turn, promotes higher quality gloss ink printing, ink economy, and wax savings!

Although full-scale production was not begun until just a year ago, when Hercules introduced CMC to the paper industry, this new cellulose gum has been under investigation at Hercules Experiment Station since 1944. Therefore, Hercules CMC is the result of continuing research and long-time production experience.

Hercules CMC—the sodium salt of carboxymethylcellulose—is a free-flowing, white, water-soluble, granular powder, supplied in 100-lb. cartons. For prices and delivery data or for detailed technical information, mail the coupon today.

HERCULES

HERCULES POWDER COMPANY
INCORPORATED
962 King Street, Wilmington 99, Delaware

Send me prices and delivery data ☐
technical information ☐

I am interested in CMC for:.....
.....
.....

Name.....
Company.....
Street.....
City.....*Zone*.....*State*.....

PPB-1

®REG. U. S. PAT. OFF.

strated the value of contributions made by this committee.

A further step in promoting industrial training was the organization of the Vocational Training Committee in 1941 under the Industrial Division of TAPPI *(4)*. According to Association Year Book of 1942 the function of the Committee was "the promotion and development of educational programs for mill operating and technically trained men in paper, paperboard, and pulp mills." Activities were suspended during the war, but the committee was reactivated in February, 1946.

The Institute of Paper Chemistry was founded at Appleton, Wisconsin in 1929 *(5)*. Of significance to education and industry alike is the fact that by its charter, the Institute was affiliated with Lawrence College for academic purposes and represented one of the first cooperative movements between the two fields of endeavor *(5)*.

The stated program of the Institute of Paper Chemistry is three-fold: (1) education of manpower specifically for the paper industry at the graduate level; (2) establishment of a library with the ultimate aim of gathering all the scientific literature pertaining to pulp and paper, its chemistry and processes; and (3) prosecution of scientific research in the fundamental problems in the pulp and paper industry.

The Institute was formed by the chief executives of nineteen paper mills in Wisconsin, and by 1941 it was receiving contributions from seventy concerns representing approximately 170 mills throughout the country. These 170 mills together manufacture 60% of the total domestic production of pulp, newsprint, paper, and board.

The Institute has obtained numerous patents, has provided trained manpower for the industry, has handled about 800 projects of specific research for member mills, and has adequately demonstrated the economy and effectiveness of working partnership between industry and education.

Another important development, and a most practical one, was the establishment of the well-known paper school at Camas, Washington, by the Crown Zellerbach Corporation *(1)*. What began as a single four months' course in 1933 had, by 1936, developed into one of 4 years in length. As an agreeable surprise to those who had initiated this program, 185 students enrolled in the first class, and there has been no recession of enthusiasm for the course on the part of either the students, the instructors, the management, or the community.

In 1939 a 39-chapter textbook of over 500 pages was published. There were 600 copies of this textbook printed as its first edition, and demand necessitated the publication of a second edition of 500 copies.

Although the war necessarily curtailed enrollment, the courses were extended to 20 weeks per year in 1943. The first 2 year courses consist, respectively, of eighteen and sixteen lecture and discussion periods. Presentation of information in these courses is aided by demonstrations using laboratory equipment, slidefilms, and moving pictures. In addition, the second year students, as part of their instruction, are taken on inspection trips to each of the major manufacturing divisions of the plant. The third and fourth year courses consist of a series of lectures by outside speakers and actual mill study.

Diplomas are awarded to those successfully completing each of the four courses, and as a stimulus, prizes are given to the two highest in each class, the fourth year prize winners receiving a week's trip to paper mills in the Pacific Northwest. Cumulative records are also kept on all students for future references.

An evaluation of the program as it exists at Camas was made by O. T. Defieux *(1)* in 1940. Mr. Defieux's statement is as follows:

> In evaluating the results after seven years of experience, we ask: primarily, what has it done for the the student? Without a doubt he is a more intelligent person and this additional intelligence is applicable to the vocation he now follows and which he may follow for many years to come. The mill study phase of the training is an exceptional opportunity to develop his powers of observation. He is possessed of a greater self-confidence which allows him to perform his duties in a more intelligent manner. He is more able to realize the importance of his own personal job, and that of his department, in the continuity of mill operations.
>
> Many of the graduates have received promotion, some of which could be directly attributed to this opportunity for vocational training. Others undoubtedly would have received promotion irrespective of this training. It has provided a common meeting ground between student employees and supervisors which otherwise would not exist. It has been an incentive to supervisors to learn how to more ably express the knowledge they have accumulated through years of education and practical experience. This factor must have an appreciable value in respect to the normal training of employees in his department in their regular duties.
>
> There is a certain interesting reaction to this paper school by nonstudent employees which has been brought to light by the mill visits of the third and fourt year classes. The students oftentimes ask questions of the operators which they are not qualified to answer. The embarrassment thus caused has resulted in the only reasonable defense available which is the operator, in order to maintain his self respect, goes out and finds the right answers. Occasionally the result of such a situation is a new student for our next year's paper school.

Contributions by Publicly Supported Institutions

The value of vocatonal education in specific training and as general education has been recognized in Europe and the United States for many years. As evidence of the acknowledgment of these values, schools having vocational training programs have been in existence since before 1900. Vocational training in industry received consideable impetus during both world wars, and particularly during World War II. Loss of manpower to the armed forces and higher paying war industries necessitated a streamlined program of training replacements including a great number of women. During these emergencies, industry as a whole learned much concerning methods and values of conducting various types of training programs.

Training Within Industry

A brief discussion of the problems of the government financed Training Within Industry Program will serve to illustrate the importance of the programs which were organized. Starting as a two-man organization in the summer of 1940 *(2)*, TWI received as its first assignment the task of finding 350 qualified lens grinders for government arsenals and navy yards. In conferences which followed as a result of this assignment, it was discovered that 5 years had been required to train a lens grinder. The resultant study of methods which could be used in breaking in new workers on such an operation laid the cornerstone of a natonwide production training effort. The new training concept was called "key points," and it was found to be uni-

Now SULPHITE HEADACHES controlled from the start!

New Socony-Vacuum Product Attacks Pitch Problems in the Digester . . . Improves Pulp, Increases Production

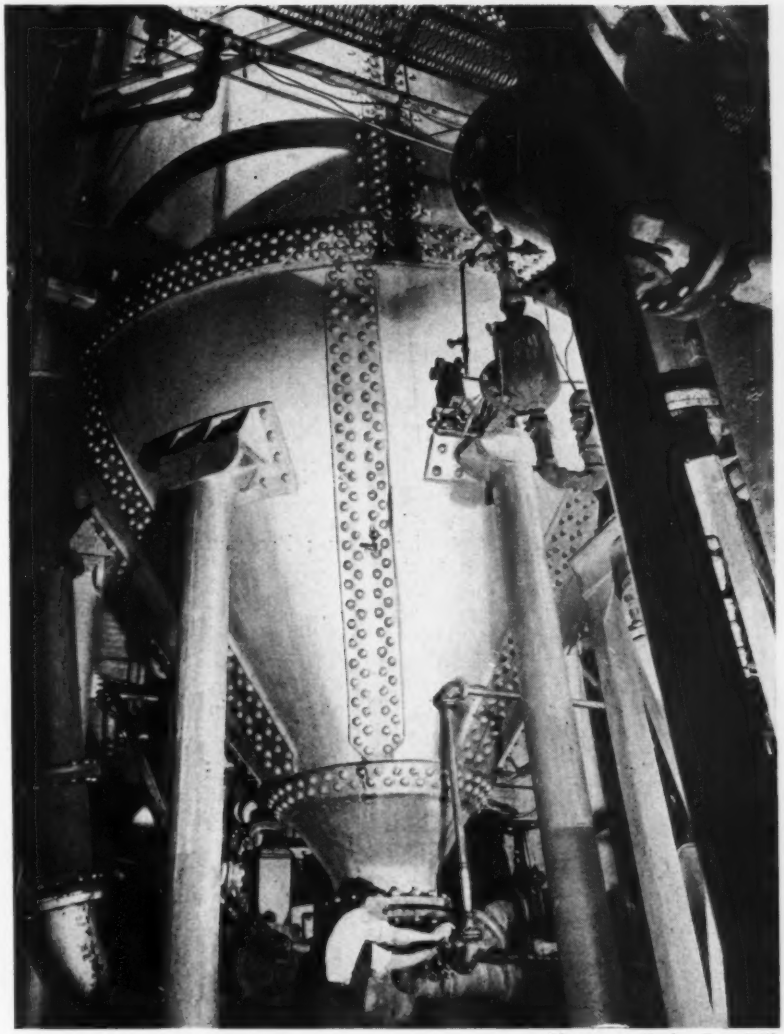


Photo courtesy Northern Paper Mills

FROM NOW ON, sulphite pulp and paper makers have a new tool. A special Socony-Vacuum product—S/V Sovalent 911—attacks and solves many sulphite processing problems right from the start—in the digester itself.

Used with the sulphite liquor, this new petroleum product provides a special solvent and plasticizing action. This facilitates the removal of some pitch during subsequent washing. Any pitch which remains is held dispersed in the pulp. Objectionable deposits are reduced or eliminated.

Slime control is improved. Dirt count is reduced. You get brighter paper.

S/V Sovalent 911 increases the penetration of the sulphite liquor into the chips. The result is a shorter, more uniform cook. In some cases, cook temperatures may be reduced. This means greater output of better quality pulp and paper.

In addition to these benefits, the moderate cost of the treatment can be justified solely on the basis of reduced down-time for cleaning felts and wires. Get full details from your Socony-Vacuum Representative.

SOCONY-VACUUM OIL COMPANY, INC.
26 Broadway, New York 4, N. Y., and Affiliates:
MAGNOLIA PETROLEUM COMPANY
GENERAL PETROLEUM CORPORATION

Socony-Vacuum Process Products

Process Products
SOCONY VACUUM

Process Products Division,
Socony-Vacuum Oil Co., Inc.
26 Broadway, New York 4, N. Y.

Gentlemen: Please send me additional information about S/V Sovalent 911:

*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

versally applicable in training unskilled workers for jobs requiring skilled operations. By subdividing jobs into simple operations, training time was reduced from years to, in some instances, days.

Pulp and paper mills had, initially, to face the problem of training large numbers of replacements. In addition to losses to other industries and to the armed forces, many mills accepted prime and subcontracts for machine parts and various sub assemblies *(6)*.

To meet this problem, maintenance men were put in responsible positions and new men were trained to work under their direction on the war production activities, as well as to replace them in their original jobs. Experience proved that recognition of the extreme importance of worker interest, logical breakdown of a job into its "key points," orderly presentation by demonstration and explanation, tryout performance, and follow-up were far superior in point of time and economy to the traditional method of permitting a new man to learn by contact with the job and the other workers on the job. In a remarkably short time, previously unskilled workmen were trained to become expert mechanic specialists.

In many localities, plants and local school districts cooperated in providing evening classes in the required skills. TWI provided Job Instruction Training for supervisors, foremen, and leadmen responsible for training new workers; Job Methods for helping supervisors see that work was being done efficiently; Job Relations for improving personnel relations; Program Development for solving production problems; and Union Job Relations for training union stewards. Management's reaction to the value of TWI is indicated in Table I.

The states served most extensively by TWI are, in general, those listed by the War Production Board as leading in industrial production in 1939 and again in 1945 *(2)*:

States Having Top Industrial Production According to WPB	States Having Top Number Plants Served by TWI (a)	States Having Top Number TWI Certificates (b)
1. New York	1. Pennsylvania	1. California (c)
2. Pennsylvania	2. Ohio	2. Ohio
3. Illinois	3. New York	3. Pennsylvania
4. Ohio	4. New Jersey	4. New York
5. Michigan	5. Michigan	5. Illinois
6. New Jersey	6. Illinois	6. Michigan
7. Massachusetts (d)	7. California	7. New Jersey
8. California	8. Washington	8. Indiana
9. Indiana (e)	9. Massachusetts	9. Washington

(a) 59% of plants served by TWI in these nine states.
(b) 59% of TWI certificates in these nine states.
(c) 11% of all TWI certificates in California.
(d) Thirteenth place in number of TWI certificates.
(e) Tenth place in number of plants served by TWI.

In tabulating the use of TWI programs, 24 classifications were used. Excluding four special groups, paper and printing and lumber and lumber products ranked respectively in the twenty groups as follows *(2)*:

Number of establishments served.....	12th and 13th
Number of employees	13th and 17th
Number of supervisory certificates.....	12th and 17th

Cooperation between TWI and various State Departments of Vocational Education originated in New Jersey *(2)*. Under provisions issued by TWI in October, 1941, districts were required to make arrangements with the State Vocational Education Department for financing the payments to trainers and for designating a schedule supervisor. In February, 1942, the first official instructions for the administration of the Job Instruction Training program were sent to field representatives; the instructions were jointly approved by the United States Office of Education and TWI. It was not proposed that TWI should replace any vocational education. foremanship, or other form of in-plant training. Exercise of powers of certification, selection of top personnel, quality control, rates of pay, and other such items were either divided by agreement or executed jointly.

In spite of some instances of strained relations between the two groups, the entire wartime experience represents a period of healthy growth for vocational education in general. Of particular importance to this discussion is the lesson learned by TWI that "if industry had paid its own trainers' costs from the start, serious interest would have begun at an earlier date and results would have been obtained sooner." *(2)*

Higher Education

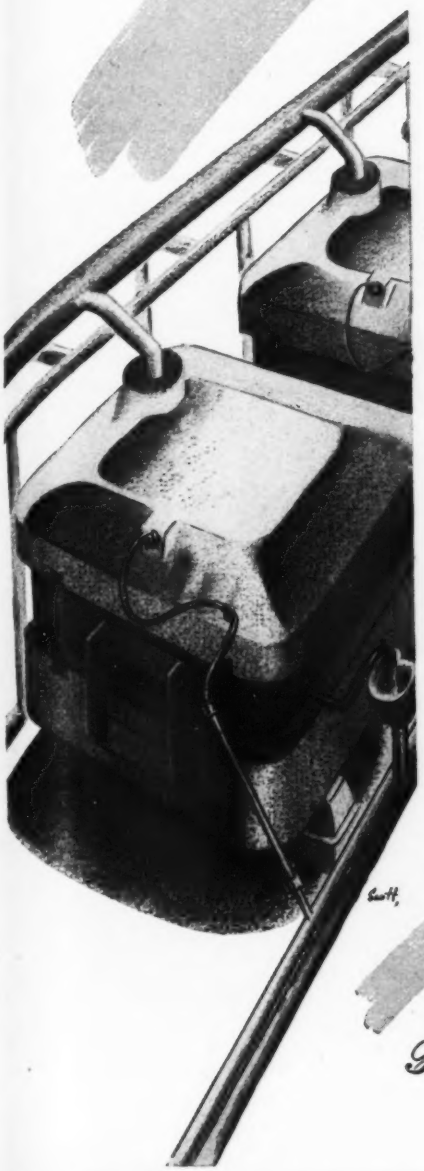
Of thirty-two state supported colleges and universities which are so located that they might be expected to offer courses in forestry and related fields, nineteen grant a degree in forestry, five of these also give a degree in wood utilization or technology, and three of the group provide major work in the manufacture of pulp and paper. Some schools of this group require, and others suggest, a 5-year program for the Bachelor of Science degree. A Master of Science or Master of Forestry degree is offered by eight of the nineteen institutions; of these, two are equipped to give advanced degrees in wood technology and one in the manufacture of pulp and paper or forest chemistry. Several of the colleges and universities which offer a degree only in forestry include work in the manufacture of pulp and paper in varying degrees of emphasis, but the important factor to note is that all curricula require some form of practical experience.

According to the catalogue of the University of Michigan, courses in forestry were first offered there in 1881; in 1903 a Department of Forestry in the College of Literature, Science, and Arts was formed; and in 1927 the School of Forestry and Conservation was established. The present course leading to the degree Master of Wood Technology emphasizes training of technicians and executives for industry.

The University of Maine, New York State College of Forestry, and the University of Alabama are the three institutions which give degrees in pulp and paper manufacture. New York State College of Forestry gives a Bachelor of Science Degree in the manufacture of pulp and paper, Maine gives a degree in chemical engineering with a major in pulp and paper technology, and Alabama gives a degree in chemistry with an option in pulp and paper. In addition to the 4-year undergraduate course of training in the manufacture of pulp and paper at the New York State College of Forestry, qualified graduates may complete the requirements for the Master of Science degree in pulp and paper manufacture or forest chemistry, and a limited number may take work in forest chemistry leading to the degree of Doctor of Philosophy. This is the only state supported institution in which work on this level is offered. With o total enrollment of approximately 750 at this institution, the second largest registration of five possible fields of activity is the work in pulp and paper manufacture. is available for student instruction; mill experience is a part of the required curriculum.

Another example of facilities offered by publicly supported institutions is the School of Agriculture and Forestry of the North Carolina State College of Agriculture and Engineering, University of North Carolina. In order to graduate in 4 years, a student must attend school each summer, one of which is spent at a summer camp. The spring term of the junior year is spent at Hoffman Forest, a forest area of over 80,000 acres, located in southeastern North Carolina. Other aids to learning include an arboretum of more than 70 acres

How Hooker cell research helped bring bleaching costs down



THE WRIGHT BROTHERS had just proved that a heavier than air machine could sustain itself in flight, when a group of men with foresight along different lines, organized to explore the possibilities of a new patent. The object of this patent, the Townsend cell, was a new type of electrolytic, diaphragm cell. In exhaustive tests it substantiated the claims made for it in producing chlorine by passing direct current through a brine solution.

In 1906, just three years later, the Hooker Electrochemical Company was in operation at Niagara Falls close to an unfailing source of hydro-electric power, and ready to supply its chief product, bleaching powder, to the pulp and paper industry.

Hooker chemical engineers have kept up continuous research and experimentation to improve Hooker cell efficiency and bring costs down. In 1913 the Hooker "F" cell gave way to the "E" cell. Later improvements are found in the present Hooker type "S" cell of radically new design. This cell is highly efficient as to power and economical as to cost of installation, maintenance, and operation—all of which means uniform quality chlorine and caustic to you at a reasonable price. Because of these improvements in cell design and other manufacturing economies, the price of chlorine has been brought down from $120.00 a ton in 1921 to approximately $40.00 a ton today.

Coincident with these developments, Hooker Technicians were working with pulp and paper making chemists; suggesting new bleaching techniques, conducting experiments and tests to learn the why and the how of pulp and paper processes. Their findings are available in Bulletin form reprinted by the Hooker Electrochemical Company. They cover subjects of interest to everyone in the pulp and paper field. Those of you who have recently become associated with this industry will find them of especial profit. Send for a list of the currently available Hooker Bulletins.

HOOKER ELECTROCHEMICAL COMPANY

6 UNION STREET, NIAGARA FALLS, N. Y.
New York, N. Y. Wilmington, Calif. Tacoma, Wash.

From the salt of the earth

HOOKER CHEMICALS

Caustic Soda Muriatic Acid Sodium Sulfide Paradichlorbenzene Chlorine Sodium Sulfhydrate

near Raleigh, a wood technology laboratory, a timber-testing laboratory, and a greenhouse.

If present plans materialize, the University of Georgia may be in a position to offer a comprehensive curriculum in the manufacture of pulp and paper in the near future. The mayor of Savannah has petitioned the University to take over the Herty Laboratories for use as instructional equipment in such a course. Realization of this project will assist the industrial development of that section of the country and it will benefit the paper making industry.

Another current development began with the passage of a special act by the Oregon Legislature in 1941 authorizing a program of research in utilization of forest products to be carried on by the State Board of Forestry in cooperation with the State School of Forestry. The act was revised in 1945; accordingly, a Forest Products Laboratory was established on the campus of Oregon State College under the direction of the dean of the School of Forestry. Cooperation with public agencies and private industry was authorized. Also created was an advisory committee composed of representatives of the West Coast Lumbermen's Association, the Willamette Valley Lumbermen's Association, the Western Pine Association, the Oregon Plywood Association, the Pacific Northwest Forestry and Range Experiment Station, and the State School of Forestry. The governor and state forester serve as chairman and secretary, respectively.

Evening, Part-Time, and Apprentice Training

Federally-aided public schools offering evening and part-time courses in paper making are to be found in sections of the country where the industry is concentrated. Such courses are found in Alabama at the Tuscaloosa Industrial High School for negroes; at Canton, North Carolina; and at the Champion Paper and Fiber Company at Hamilton, Ohio; in Wisconsin, schools of vocational and adult education are located at Appleton, Green Bay, Kaukauna, Kimberly, Menasha, and Niagara.

Six or seven years ago the public schools of Holyoke, Massachusetts, cooperated with the American Writing Paper Corporation in inaugurating a program of work experience for training high school seniors for jobs in the paper industry *(8)*. Boys worked part time, afternoons and Saturday mornings, in the office, laboratory, and mills of the corporation, and were paid for their work.

In many cases the war stimulated the cooperative spirit to a considerable degree. A good example is the course in engineering science and management given by the West Virginia Pulp and Paper Company in the Mechanicville High School under the direction of Professor W. F. Spafford, Head of the Department of Economics, Business Administration, and History at Renneselaer Polytechnic Institute at Troy, New York *(9)*. Classes covering all phases of business management in the paper making industry were held two nights a week.

In addition to the regularly scheduled courses in the Paper School at Camas, Washington, evening trade classes were begun in June of 1941 as a result of joint action by the mill and the school district *(6)*.

Contributions of Private Institutions

In January, 1944, Saint Joseph's College, Philadelphia, conducted a lecture course in the chemistry of pulp and paper making which lasted 16 weeks. Over fifty men and women registered for it, and the course was repeated in the fall. In the spring of 1945 a laboratory course in the principles and chemistry of paper conversion was conducted. Limited facilities and considerable demand necessitated refusing admittance to some who wanted to enroll in the classes. Many who did enroll found they lacked the technical background necessary for a proper understanding of the principles of paper making. The result was the Evening School of Paper Making. The course of instruction is divided into three units of ten weeks each, and the school is in session from the middle of October to the middle of June.

New York University gave a course of fifteen weekly lectures in papermaking at the Barbizon Plaza in New York City *(10)*. Over 550 persons were enrolled; about 100 applicants could not be accepted because of limited seating facilities. Most of the lectures were given by members of the Technical Association of the Pulp and Paper Industry. A similar course for graduate engineers was given at the Polytechnic Institute of Brooklyn.

Conclusions

From these few examples of provisions for improving the quality of workmanship of industrial workers, both in the manufacture of pulp and paper, and in industry generally it can be seen that the value of skilled employees with a broad background of technical information is becoming widely recognized and appreciated. One thing well worth salvaging from the war is the experience and insight gained in the administration and value of vocational training in industry. Whether or not there exists a consciously planned training program in a particular factory, mill, or industry, no one will deny that a new man needs some breaking-in or informal training to be able to do his work satisfactorily. Surveys of TWI programs showed definite and substantial gains in production concurrent with savings in manpower. Organized training programs actually show a reduction in training time. Equal gains in reduction of scrap losses and grievances also resulted. Statistically, the advantages are so important that it can be assumed that any organized training program properly organized and administered, will produce highly profitable results.

Literature Cited

1. Defieux, O. T., Vocational Instruction at Camas. *Paper Trade J.*, Vol. 111, p. 29-31 (Dec. 12, 1940).
2. The Training Within Industry Report, 1940-1945. Washington, D. C., War Manpower Commission, Bureau of Training, Training Within Industry Service, September 1945, pp. 18-20, 91-2, 109, 112, 127, 129.
3. Wolf, Robert B., Education in the Pulp and Paper Industry. *Paper Trade J.*, Vol. 117, pp. 38-40 (Oct. 28, 1943).
4. Cassiday, Wilbur L., Report of the Vocational Training Committee, 1941. *Paper Trade J.*, Vol. 114, p. 64 (Feb. 5, 1942).
5. Steele, Westbrook, Technical Progress in Paper Industry Aided by Cooperative Research. *Textile Research*, Vol. XII, pp. 14-16 (Dec., 1941).
6. Smith, John H., Mills Wanted More War Work; Result—The Machine Shop Program. *Pacific Pulp Paper Ind.*, Vol. 17, pp. 8-21 (May, 1943).
7. Libby, C. E., The New York State College of Forestry, Department of Pulp and Paper Manufacture. *Barrell's Paper Annual*, 1944-45. pp. 25-26.
8. Cassiday, W. L., Developments in Vocational Training, 1941. *Paper Trade J.*, Vol. 114, p. 60 (Feb. 5, 1942).
9. West Virginia Course. *Paper Mill*, Vol. 66, p. 10 (Oct. 16, 1943).
10. TAPPI Notes. *Paper Trade J.*, Vol. 124, p. 48 (March 27, 1947).

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Cyril G. Lavers, Packaging Research, Maple Leaf Milling Co. Ltd., Toronto, Ont., Canada, a 1944 graduate of the University of Saskatchewan.

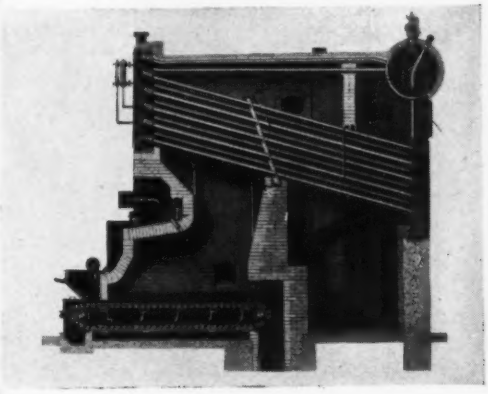
George L. Adams, Technician, Standardization Laboratory, Metropolitan Life Insurance Co., New York 10, New York, attended New York State College of Forestry.

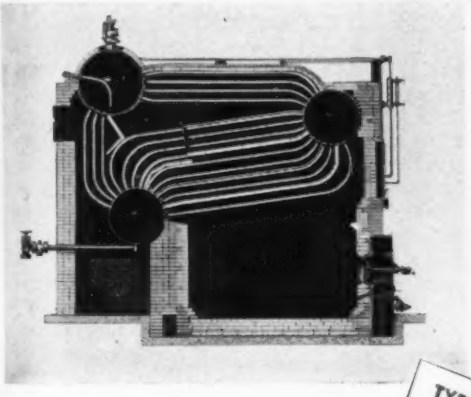
Big Benefits

ARE "WRAPPED UP" IN THESE THREE SMALL BOILERS...

B&W "CUBS"*

Design 32, Type H Stirling, and Type FF Integral-Furnace Boilers were specifically designed for this purpose: supplying steam requirements from 10,000 to 50,000 lb. per hr. and more at pressures above 160 psi, with definite cost-saving benefits to their users in installation, operation and maintenance.





ALL are fully coordinated, flexible units — from fuel burning equipment to breachings and stacks—built and installed under undivided responsibility.

ALL are time-tested, performance-proved units of simplified design and standardized manufacture.

ALL fully meet modern requirements as to fuel flexibility, compactness, ease of operation, fast-steaming and ability to take sudden load swings.

ALL sustain high operating efficiency over their wide range of output, and generate steam of satisfactory quality at all ratings.

ALL have provision for the addition of steam superheaters.

ALL embody design, construction and operating features that account for the heavy preference for larger B&W boilers for central stations and large industrial applications.

ALL are matched to their jobs for highest standards of performance, continuity of service and long-term economy.

***Complete Unit Boilers**

Each as much a package boiler as any unit its capacity can be.

G-382

FOR PAPER MILLS — B&W-Tomlinson Recovery Units . . . B&W, Integral-Furnace, Stirling, Type H Stirling and Cross-Drum Boilers . . . Boiler Components . . . Pulverizers . . . Fuel Burning Equipment . . . Seamless & Welded Tubes for All Pressure and Mechanical Applications . . . Refractories . . . Process Equipment . . . Alloy Castings.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: ALLIANCE AND BARBERTON, O.; AUGUSTA, GA.

Pulping of Straw with Digestion Liquors Containing Sodium Sulphite*

By George S. Hannaway[1]

Abstract

A summary of existing practices in pulping straw is provided. Requirements for a good strawboard are discussed, and characteristics of a typical sheet are given. Objectives for process improvements are briefed. The mechanism of alkali and sodium sulphite digestion of straw is outlined. Results of a series of mill trials on the pulping of straw with digestion liquors containing sodium sulphite are provided along with results of tests made on the finished paper. Similar test results are given for the product of another mill before and after adapting a cook containing sodium sulphite. The advantages which may be expected to develop from the use of sodium sulphite are listed.

There is nothing new about the use of sodium sulphite in the pulping of wood. Its adaptation to the pulping of straw, however, is a relatively new subject which is arousing decided interest on the part of strawboard manufacturers.

The original work on pulping of straw with pulping liquors containing sodium sulphite was reported by Rue and Monsson in 1925. This work was covered by a patent issued in 1932 to Rue, Wells, and Rawling. They found that when straw was pulped with 7.5% soda ash and 1.5% sodium sulphite, a strawboard with superior strength characteristics was produced. The cost of pulping straw by this method today, however, would be excessive when compared to methods currently in use. It was decided, therefore, at the outset of current work with sodium sulphite, that an attempt should be made to improve the quality of the strawboard while keeping the cost of pulping comparable to conventional methods.

Certain advantages may be expected from the use of digestion liquors containing sodium sulphite for the pulping of straw; namely: (1) reduction of the amounts of other chemicals used, (2) improvement in properties of the paper, (3) reduction of washing time of pulp in the beaters, (4) improved operation of paper machines, (5) decreased waste white water disposal problems, (6) increased monetary return for a given weight of paper, and (7) improvement of yield.

Straw Cooking Methods

There are many methods of cooking straw for the manufacture of strawboard. This paper will provide an introduction to certain work on the pulping of straw with digestion liquors containing sodium sulphite.

It is of interest to consider some of the ways in which methods of cooking straw vary. As far as the chemical makeup is concerned, lime (both high-calcium and dolomitic), caustic soda, soda ash, sulphur, and sodium sulphide are the principal chemicals used —but they are used in a multitude of combinations, each with the other. In every mill, a certain cook is favored, either because it is considered best, because operating conditions enforced its adaptation, or because it produces a satisfactory product at low cost.

The steam pressure under which digestion is carried out varies as greatly as chemical makeup. Most mills use a pressure in the 30 to 50 p.s.i. range, but some successfully use exhaust steam at as low a pressure as 5 p.s.i.

Cooking time may be from 3 to 12 hours after the last fill.

The amount of straw charged to a rotary may also vary widely. From one to six fills of straw may be made in each rotary for a cook. Some operators feel that one fill with a short cook gives the best results and the maximum production; other operators favor several fills and a longer cooking time to achieve the same end.

Apparently, agreement exists only on two points—that straw must be cooked in a rotary spherical digestor and that it is not necessary to vent off noncondensable gases after the last fill is made. Some work is being done on pulping straw in other types of digestors, but the rotary will probably remain the accepted digestor for some time to come.

Parallel consideration of the problems of pulping straw and wood indicates that since gaseous reaction products, such as carbon dioxide, are formed when acid-bearing woods are pulped with an alkaline liquor, the same sort of situation should obtain when straw is pulped with alkaline liquor. If 25% of the total pressure in a digestor is the partial pressure of a noncondensable gas, the true internal temperature is not that to be expected from consideration of the pressure. It is surprising that so little importance is attached to actual temperature conditions within digestors since it has been proved that temperature, rather than pressure is the critical factor in delignification reactions. Payment of more attention to temperature-pressure relationships and presence of noncondensable gases would most likely bring to light some interesting facts.

The foregoing is an attempt to show that there is no standard method of cooking straw. Surely the very fact that so much disagreement exists as to the preferred method of cooking straw, is a most cogent argument for experimental work directed at determining optimum conditions.

Strawboard Requirements

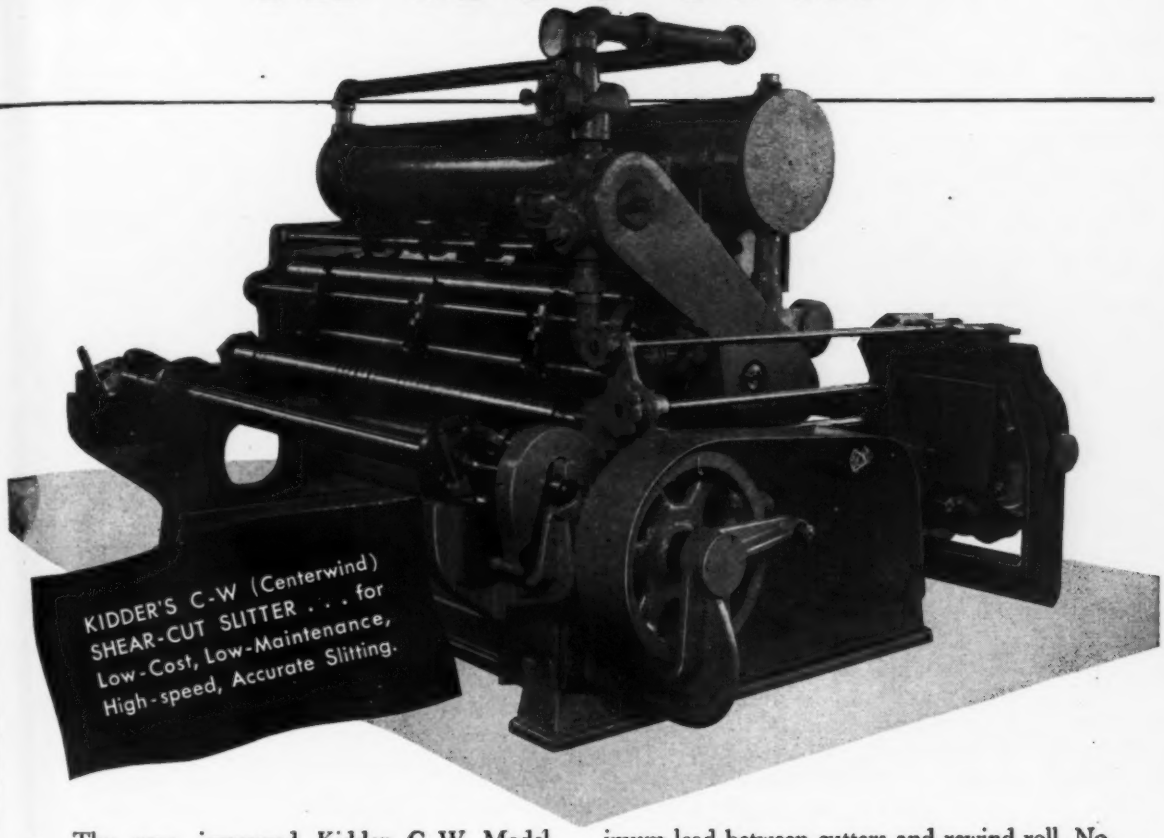
It will be in order to consider the requirements for strawboard and it will first be assumed that practically all strawboard finds its way into corrugated paper.

The first criterion of a good corrugating paper is rigidity for it is the rigidity of the corrugated inner wall which gives crush resistance to a corrugated paper box. Rigidity is customarily measured by the Riehle test. It is a natural consequence of the accelerated demand for corrugated paper in recent years

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

[1] Sales Development Dept., Organic Chemicals Div., Monsanto Chemical Co., St. Louis, Mo.

Processed Stock Rolls Hum Off AT 1500 FPM



The new, improved Kidder C-W Model Slitter delivers accurately-cut, dustfree rolls of processed stock in widths 2″ or more at 1500 fpm. Rolls are never burred or interwoven . . . they fall apart by themselves. The centerwind principle, without rewind drums, allows slitting of most types of papers from light tissues to heavy-coated tag stocks.

Automatic Carriage — a Kidder exclusive — in which the carriage moves backward as the rewind roll grows bigger, assures constant, minimum lead between cutters and rewind roll. No chance for interweaving rolls.

Automatic Hydraulic Tension Control — prevents interweaving. Kidder engineers have applied this principle to the C-W model to assure constant web tension. Simply set the desired tension on the dial and it is automatically maintained throughout the run.

Scissors-Action — Shear-type cutters, self-sharpening for low maintenance, *cut* the *web* cleanly.

KIDDER PRESS COMPANY, INC.

DOVER, NEW HAMPSHIRE

A. E. MARCONETTI
11 W. 42nd St., New York 18, New York

MACHINERY SERVICE CO.
P. O. Box 33, Los Angeles 11, California

KIDDER THREE POINT PRESS

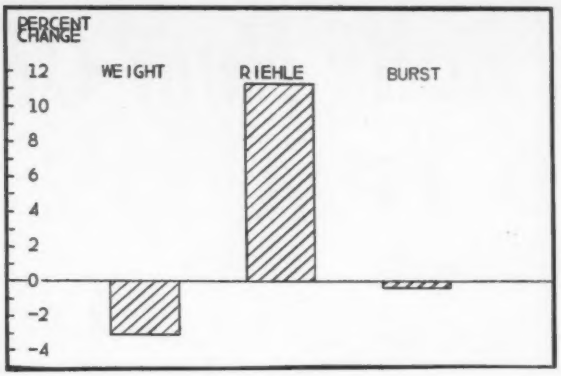


FIG. 1

Per cent Change in Various Properties, Sodium Sulphite-made Sheet Compared to Sheet Made by Conventional Process

that rigidity standards were lowered somewhat, but forward-looking strawboard manufacturers are now giving attention to improving the rigidity of their products knowing that a demand for better quality is certain to develop.

In a corrugated paperboard box, made of two liner sheets, on either side of a corrugated sheet, the liner sheets provide most of the tensile and bursting strength of the composite board. The corrugated member is in compression. Bursting strength is nevertheless, probably the test second in importance to rigidity where strawboard is concerned.

To define a "typical strawboard as presently produced" is difficult, since the extremes vary so greatly from the mean. However, for purposes of comparison, some average values are important, and the following figures are thought to represent an average product.

Weight of sheet	30 to 32 pounds per 1,000 square feet
Caliper	9 to 11 points
Riehle (conventional type)	20
Bursting strength	36 to 39

The average sheet of strawboard is somewhat uneven in density, having thin and thick spots in some profusion. Sheet weight often varies 2 to 3 pounds or more on contiguous samples cut from a production run.

Use of Sodium Sulphite

In considering the introduction of a new process, such as pulping with liquors containing sodium sulphite to the strawboard industry, one must take cognizance of the most important problems of the industry. If no improvement can be made along necessary lines it is unlikely that widespread interest and acceptance will be accorded a new process development. The ways a new cooking process represent an improvement are: (1) by producing a superior product, (2) by reducing plant operating problems, (3) by reducing stream pollution problems, and (4) by increasing production with existing facilities.

Reducing cost or increasing profit will be the final result of any of the above. Now that the objectives are known, the chemical background of pulping processes will be taken up briefly.

Chemistry of Pulping

The excellent treatment of lignin chemistry in "Wood Chemistry," edited by Louis E. Wise, makes it clear that no constitutional formula can definitely be assigned to lignin. Probably, though, lignin contains methoxy, carbonyl, and hydroxyl groups. Evidence indicates it to be of both alkyl and aryl nature. But as long as the structure of lignin itself remains in doubt, it will be difficult to define the action of any cooking chemicals on lignin; however, it is felt that the following statements are essentially correct.

In alkaline processes of pulping, lignin is decomposed into materials of lesser molecular weight which go into solution as sodium salts. This is accomplished along with the generally unwanted solubilizing, at least partially, of hemicellulose and pentosan contents. In the case of straw pulping, a strong caustic liquor made from lime, caustic soda, soda ash, or a combination of some of these, undoubtedly attacks the sizable silica content of the straw. Strongly alkaline pulping liquors attack alpha-cellulose more or less vigorously.

In the process of pulping straw with a digestion liquor containing sodium sulphite, it is assumed that the sodium sulphite adds on to the lignin molecule at an ethylenic double bond to produce soluble sodium lignin sulphonates. While there is an attack on hemicellulose and pentosan contents, it is less vigorous than in the case of a caustic or lime cook. A cook consisting mainly of sodium sulphite exercises negligible action on the alpha-cellulose content of straw.

Pulping Straw

While the value of sodium sulphite in the neutral sodium sulphite semichemical pulping process for wood has been often confirmed, efforts to establish its value as a pulping agent for straw are relatively recent. A series of seven trial runs were made recently by the Terre Haute Paper Company with mostly new wheat straw. Steam pressure was as indicated in each case. Duration of pulping was 8 hours after the last fill of straw, and cooking was done in 14-foot diameter spherical rotary digestors. The sodium sulphite used was anhydrous technical grade, assaying about 96% Na_2SO_3. High-calcium lime and 58% light soda ash were used. Caustic soda was in liquid form and contained approximately 50% NaOH. Where a quantity of caustic soda is given, the amount is given as 100% NaOH. Percentages of chemicals used are based on the estimated weight of straw charged.

Run No. 1—	Pressure, p.s.i.	40
	Sodium sulphite, %	1.67
	Sodium hydroxide, %	0.40
	This cook appeared to be quite raw when completed.	
Run No. 2—	Pressure, p.s.i.	40
	Sodium sulphite, %	2.5
	Sodium hydroxide, %	0.8
	This cook was a little more tender than run No. 1, but was still too tough to be handled in the beaters without using excessive power.	
Run No. 3—	Pressure, p.s.i.	40
	Sodium sulphite, %	1.67
	Lime, %	3.00
	This cooked straw appeared nearly comparable with the usual cook which was of a conventional type.	

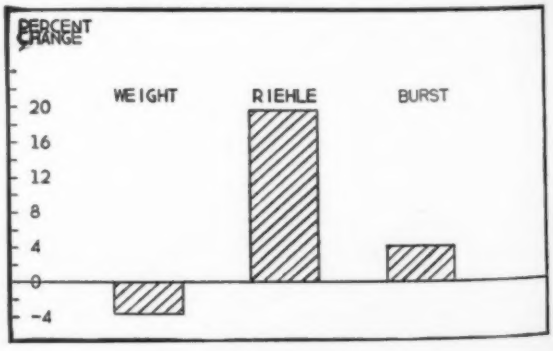
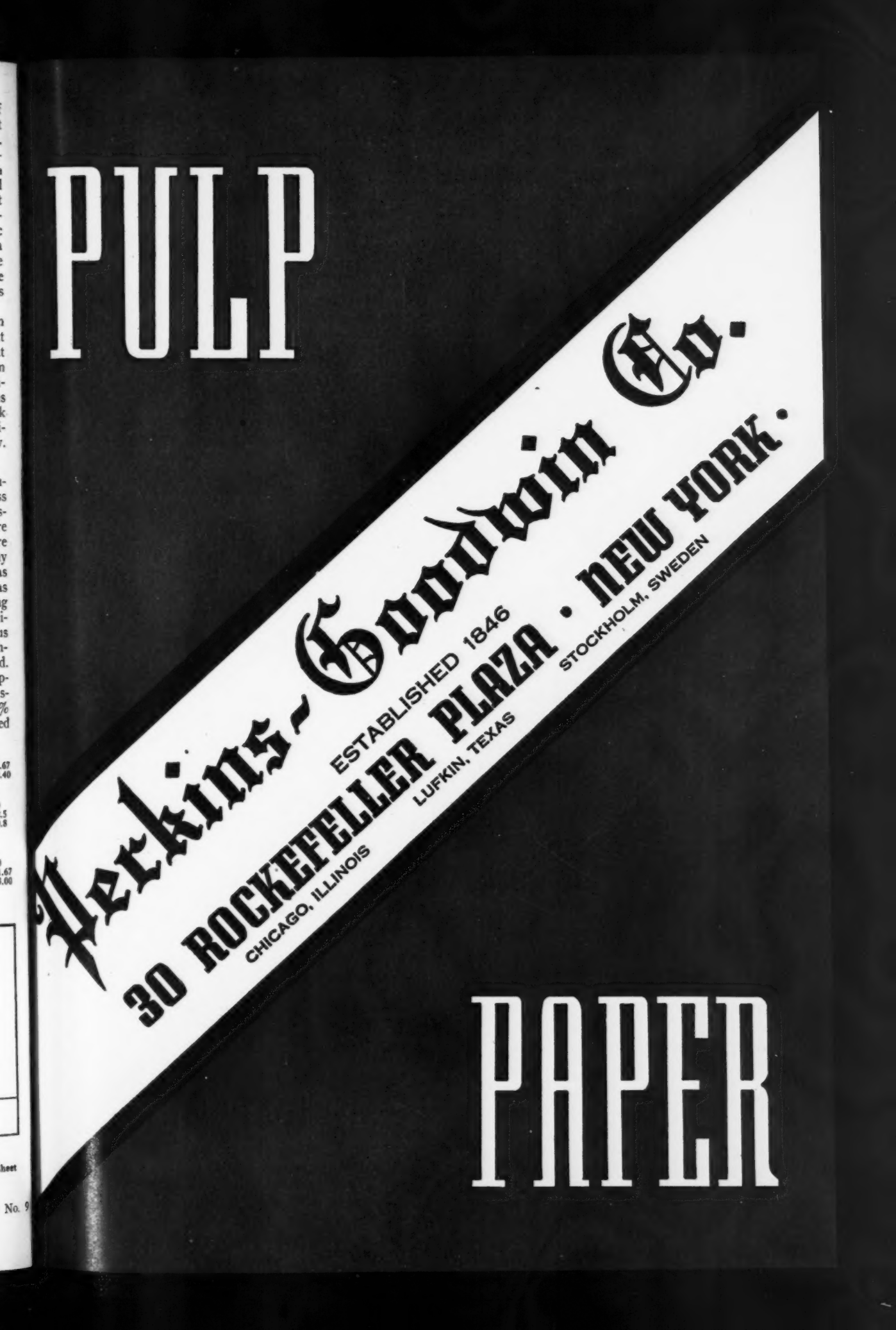


FIG. 2

Per cent Change in Various Properties, Sodium Sulphite-made Sheet Compared to Sheet Made by Conventional Process


PULP
Perkins-Goodwin Co.
ESTABLISHED 1846
30 ROCKEFELLER PLAZA • NEW YORK.
CHICAGO, ILLINOIS
LUFKIN, TEXAS
STOCKHOLM, SWEDEN
PAPER

Run No. 4—Pressure, p.s.i.		40
	Sodium sulphite, %	0.8
	Lime, %	4.0
	Sodium hydroxide, %	0.4
	The best cook, as it handled well in the beaters and appeared tender and yet strong.	
Run No. 5—Pressure, p.s.i.		30
	Sodium sulphite, %	1.25
	Lime, %	3.50
	Sodium hydroxide, %	0.50
	This pulp was tender and well cooked but curiously enough, washed slowly in the beaters.	
Run No. 6—Pressure, p.s.i.		30
	Sodium sulphite, %	1.25
	Lime, %	3.50
	Soda ash, %	1.25
	This pulp was satisfactory in every respect. It was tender and well cooked and washed very freely in the beaters.	
Run No. 7—Pressure, p.s.i.		30
	Sodium sulphite, %	1.8
	Soda ash, %	2.5
	This pulp appeared quite raw when cooked for 8 hours and did not seem promising.	

On the basis of the above briefly described tests, a ten-rotary series of runs was decided upon. Run No. 6 was selected as being the most promising for this series. The chemical makeup of Run No. 6 was modified as follows:

Sodium sulphite, %	1.25
Lime, %	4.00
Soda ash, %	1.25

Pressure was normal operating pressure—30 p.s.i. Cooking time was 8 hours after the final fill of straw. The straw used was new wheat straw, and two fills were made per rotary.

No irregularities were noted in the cooking cycle. The pulp handled well in the beaters with the procedure being to set the roll down on the bedplate at first and ease off after about 30 minutes. The pulp washed very freely and the individual fibers appeared longer and stronger than those in the usual pulp. No special adjustment of the jordans was necessary.

The stock handled normally on the machines which were of the two-cylinder type. Machine speed was maintained at standard. There was a slight tendency of the paper to be "wild," but this caused no serious difficulty. The paper produced by this special cook, together with representative samples of regular production, was subjected to examination by three different laboratories. Averaged results are given below with the special cook designated as "sulphite":

Weight	Regular 31.6	Sulphite 30.8
Caliper	Regular 9.8 points	Sulphite 9.6 points
Riehle	Sulphite-made sheet was 11.25% higher	
Bursting strength	Sulphite-made sheet was 0.36% lower	

The cost of the sodium sulphite cook was quite competitive with the cost of the conventional cook—that is, it was but 7% more. Of course, prices of many pulping chemicals may change, but the cost of pulping with sodium sulphite will continue to be reasonable.

The test results previously given indicate the use of sodium sulphite in pulping straw to be well worth considering, despite the slightly higher cost. It may be argued, however, that a test covering only a series of ten rotaries is lacking in validity. For this reason, it is desirable to present below comparable data representing "before and after conditions" in another strawboard mill which formerly used a conventional mixture of pulping chemicals, and has now standardized on a cook embodying sodium sulphite as the main cooking chemical, together with certain quantities of lime and caustic soda:

	Previous Cook	Sulphite Cook
Weight	34	32.8
Caliper	10 points	11 points
Riehle	Sulphite-made sheet was 19.5% higher	
Bursting strength	Sulphite-made sheet was 4% higher	

This mill, incidentally, has reported no tendency of the pulp to be wild on the machine.

Because of the variations in results obtained by different laboratories, it has been deemed advisable to report results of Riehle and burst tests as percentage increases or decreases, rather than as absolute values.

It may be stated then, that a satisfactory grade of strawboard for corrugating may be made by the use of pulping liquors containing sodium sulphite, lime, and caustic soda or soda ash.

Advantages in Use of Sodium Sulphite

Experience thus far indicates that the following advantages may be derived: (1) reduction of lime use by about 50%, (2) improvement in important properties of the paper, notably rigidity; (3) reduction of washing time of pulp in beaters. In one mill which handles washing and breaking operations in two separate beaters, the total combined time is 1 hour 10 minutes. (4) Greatly reduced liming of paper machines, which allows smoother and more continuous operation. (5) Reduction of fines in pulp which tends to give waste white water a lower Biological Oxygen Demand. (6) The possibility, through production of a lighter weight sheet, of obtaining about 3% more money for a given weight of sheet. (7) Improvement in yield may be expected from the milder action of the cook. No concrete evidence can be offered to support this probability however, since yield determinations must be made carefully over extended periods of time, and are particularly subject to error when the amounts of broke and scrap stock vary.

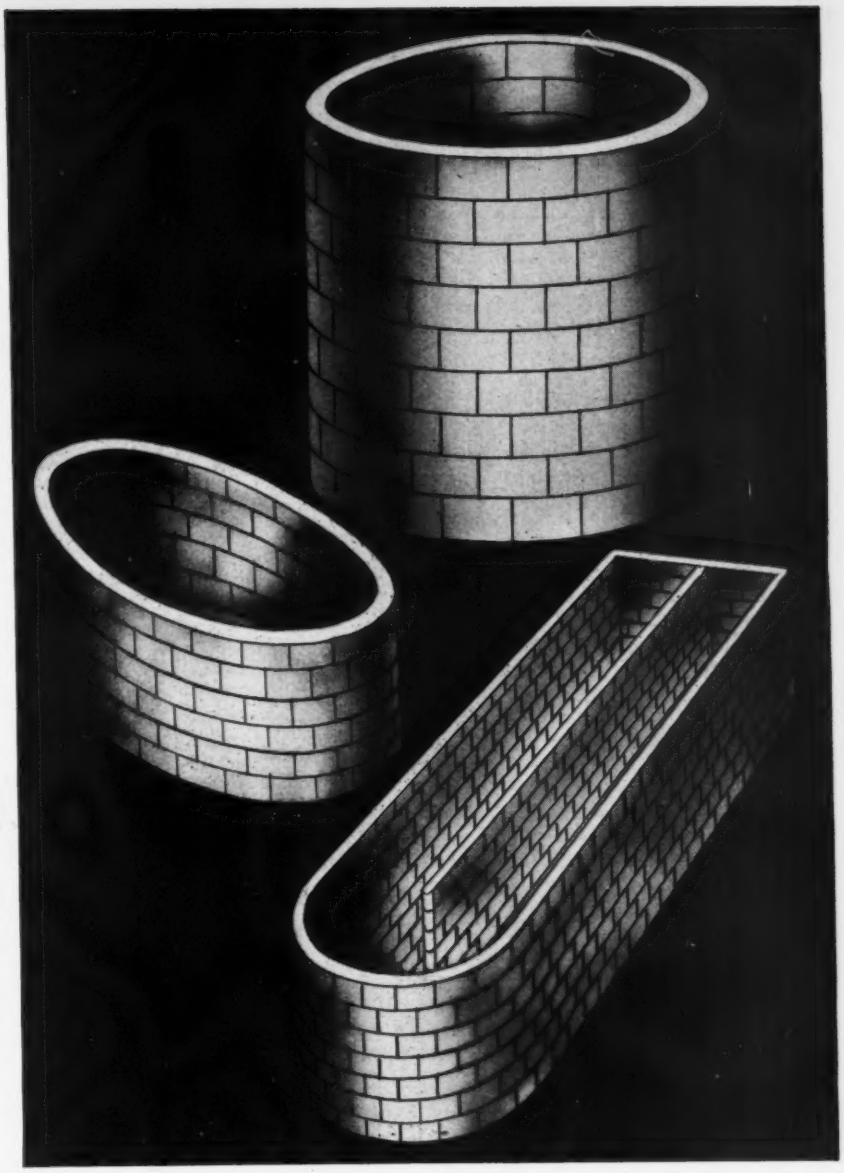
Sodium sulphite is being used to pulp straw, manila hemp, and hard- and softwood chips. Experimental work is in progress to establish its value for pulping many kinds of agricultural residues.

It is attractive to pulpmakers because its mild cooking action produces maximum fiber strength a high yield and because it is adaptable to cooking processes for practically and fibrous cellulose-bearing raw material. Zero, or at most, slight, expenditures for additional processing equipment are necessary.

In a semichemical type of process for pulping wood, notable economies in chemical consumption may be achieved with the use of sodium sulphite and, at the same time, stream pollution problems can be alleviated. It is possible that future work in the pulping of straw with sodium sulphite will indicate ways to enable its use in a semichemical type of process. This would allow marked reduction in stream pollution since in a semichemical process only the amount of chemical which will be consumed remains in the digestor for the duration of the cook.

Several experiments on cooking straw with pulping liquors containing sodium sulphite have been made; two cooks have been found which giv desirable results. In the two coks thus far considered most satisfactory, sodium sulphite was used along with lime, and this procedure is believed to cause precipitation of relatively insoluble calcium sulphite. Perhaps in the future it may be found that when pulping is carried out at higher temperatures, a simple mixture of sodium sulphite and caustic soda or sodium sulphite and soda ash will give superior results when used in conjunction with adequate refining equipment.

ANY SIZE *or* SHAPE *of* PAPER MILL TANK *or* CHEST *can be built with*



Kalamazoo GLAZED TILE

Consult our Engineers for ESTIMATES

Complete Erection Service

KALAMAZOO TANK & SILO COMPANY

Kalamazoo, Michigan : U.S.A.

Yield and Quality of Pulp and Waste Liquor in Sulphite Pulping of Softwoods

By M. Baum[1], J. W. Bard[1], J. R. Salvesen[1], and G. J. Brabender[1]

Abstract

Experimental sulphite pulping of eastern hemlock was carried out to establish the influencing factors on yield of lime-precipitated lignin from the resulting sulphite waste liquors. Data were obtained on yield and bleachability of the corresponding pulps. The pulping variables investigated included: Unreacted and combined SO_2, cooking time, and maximum temperature. Results given in curves for pulps having permanganate numbers of 16.9, 12.7, and 8.4 show that the highest yield of precipitated lignin is obtained when processing liquors from pulps having the lowest permanganate number. When liquor from pulps of low permanganate number is processed the recovery of lignin is practically unaffected by composition of cooking acid or maximum temperature over the range studied. When pulp of higher bleachability is produced, lignin recovery is more favorable at lower concentrations of unreacted SO_2 and, to a lesser extent, at lower combined SO_2 in the cooking acid. Tables are given showing per cent distribution of lignin in (a) pulp (b) irrecoverable waste liquor (c) lime-precipitated fraction and (d) effluent from recovery process. These results are shown for typical sulphite cooking conditions producing pulps with three different bleachabilities.

Effect of the same cooking variables on yield and bleachability of Eastern hemlock pulp are given in accompanying curves which show trends in agreement with results reported by others.

Similar investigations made using spruce wood give the same trends and therefore allow the same conclusions

The sulphite pulping process as commonly practiced utilizes only about 50% of the wood raw material. The nonfibrous wood components solubilized in the cooking process are allowed to run to waste from most sulphite mills. This inefficient utilization of a raw material which is becoming more expensive and scarce has long been recognized. Efforts to economically utilize the nonfibrous components resulting from sulphite pulping are receiving increasing attention. The fact that wasted wood components from sulphite mills give rise to a serious stream pollution problem for many mills further emphasizes the need for establishing efficient processes for utilizing wood components which now go to waste. The ideal scheme for the sulphite process would be one in which the three main wood components, namely, cellulose, hemicelluloses, and lignin all could be profitably utilized.

Marathon Corporation in its Rothschild sulphite mill has operated for a number of years a process *(1)* whereby the sulphite waste liquor from the blow pits is treated with lime to precipitate (a) a fraction containing mainly calcium sulphite which is returned in slurry form to the cooking acid makeup system and (b) an organic precipitate consisting mainly of lignin in the form of basic calcium lignosulphonate. The latter product, segregated as a filter cake with about 32% solids, constitutes the starting material for lignin conversion products which is marketed for numerous uses. This treatment also results in obtaining an effluent with considerably reduced stream polluting characteristics *(2)*.

Research as well as experience from large scale operation has shown that the quality of the sulphite waste liquor is important from the standpoint of yield of lignin and thereby the economics of this process. The sulphite digester operation is therefore important not only for the quality and yield of pulp produced but also for the sulphite waste liquor which results from the cooks. Since the available literature contains no information relative to the relationship between sulphite cooking conditions and sulphite waste liquor characteristics pertaining to lignin precipitation with lime, research groups in the Pulp and Paper Division and the Chemical Division of Marathon Corporation have been engaged for several years in a study of the factors involved. A review of some of the results is presented herewith in a condensed form from the large amount of experimental data obtained.

An important phase of the investigation consisted in establishing the distribution of lignin between the pulp and the sulphite waste liquor, as affected by the different sulphite cooking conditions. The usual washing operation in the blow pit removes practically all of the sulphite waste liquor from the pulp. This eventually brings about dilution and cooling of the draining liquor so that the last part of it is impractical to process with lime and this part is bypassed to the sewer. The amount of irrecoverable liquor constituting the bypassed portion depends on the existing blow pit operations. At Rothschild the plant operations have shown that 20% of the total sulphite waste liquor solids are thus unsuitable for waste liquor processing. Of the lignin present in the liquor suitable for processing only a part is recoverable by lime precipitation.

Therefore after the sulphite cook the lignin is considered to be distributed as follows: (a) residual lignin remaining in the pulp, (b) lignin in sulphite waste liquor too dilute for processing, (c) lignin precipitated with lime, and (d) lignin remaining in process effluent.

Figure 1 gives a graphic illustration of such lignin distribution for a definite set of cooking conditions with spruce and hemlock wood. It is primarily the object of this paper to report how the sulphite cooking variables affect the yield of precipitated lignin as well as yield and bleachability of pulp. Such information is required to answer the question: What pulping conditions will most economically give desirable pulp and simultaneously high yield of precipitated lignin?

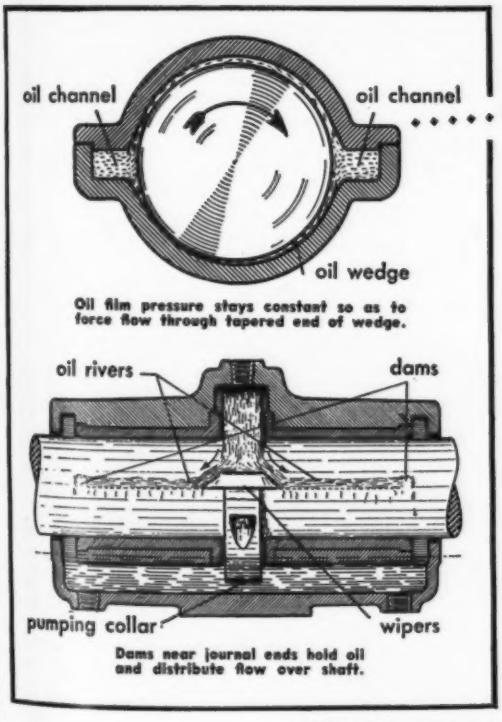
Most of the detailed experimental work was done

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

[1] Marathon Corporation, Rothschild, Wis.

sandy hill-cleveland type oil-film bearings

free of metallic friction


oil channel
oil channel
oil wedge
Oil film pressure stays constant so as to force flow through tapered end of wedge.
oil rivers
dams
pumping collar
wipers
Dams near journal ends hold oil and distribute flow over shaft.

. . . . . shaft floats on wedge-shaped oil film

This bearing carries heavier loads, operates at higher speed, gives uninterrupted flow of power. Out-does many ordinary bearings because it is friction-free and void of metallic contact. Bearing and shaft never touch! A flowing wedge-shaped film of oil forms a cushion on which the shaft floats free. Flow is always ample. Maintenance is minimized. Large capacity oil reservoir built in the bearing bottom seldom requires refilling.

SIMPLE OPERATION — TROUBLE-FREE PERFORMANCE

Heavy split collar elevates oil from the bearing bottom. Metal wipers distribute flow along the journals. Chamfered bearing liners permit the rotation of the shaft to force the oil past the wedge opening and under the journals. Oil collar also acts as thrust collar.

SANDY HILL-CLEVELAND TYPE OIL FILM BEARINGS ALSO AVAILABLE IN WATER COOLED TYPES FOR ECONOMIZER, INDUCED DRAFT FAN, AND BLOWER APPLICATIONS

Sandy Hill
IRON & BRASS WORKS
HUDSON FALLS, N. Y.

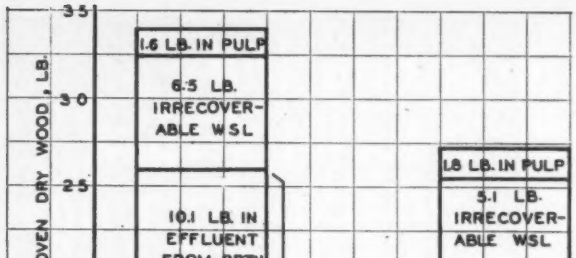


FIG. 1
Typical Lignin Distribution Diagram

with Eastern hemlock *(Tsuga canadensis)* but a sufficient number of cooks have also been made with spruce *(Picea mariana)* to establish that the trends and therefore conclusions are similar for the two wood species.

Screened chips were obtained during routine operation of the Rothschild wood room. Sufficient chips for one series of cooks were obtained at one time, mixed well, sampled for moisture content and stored in moisture proof bags as individual digester charges. Cooking acid was prepared from slaked lime and stainless steel digester of 10 pounds moisture-free chip capacity, equipped with liquor circulating line and pump, double pass liquor heater, water injector and relief line. Compensation for steam dilution in the directly steamed mill digesters was secured by injecting water into the experimental digester. The water injector was operated under nitrogen pressure at 20 p.s.i. above the digester pressure. All cooks were blown after relieving the digester down to 40 pounds pressure. The cooking curve used up to the point of maximum temperature was the same for all the cooks. This curve for temperature and digester pressure is shown in Fig. 2.

The digester was blown into an empty blow pit and 1 gallon of strong sulphite waste liquor was collected from the first drainage. The stock was washed thoroughly, agitated to break up fiber bundles and screened on an experimental flat screen having two commercial plates with 0.006 inch slots. The pulp was shredded by hand, mixed well, and yield of moisture-free screened pulp and screenings were determined. Bleach requirement of the screened pulp was determined by TAPPI Method T214 m-42 for permanganate number. In addition, the screened pulp was also analyzed for methoxyl content *(3)* and for lignin content with the TAPPI Method T222 m-43. However, as is well known, the analysis for lignin in sulphite pulp is very difficult and the results obtained seemed unreliable and did not agree with the methoxyl analysis, which latter is reliable and easily duplicated. It was therefore decided to calculate the lignin content of the screened pulp from the methoxyl analysis by means of the following equation:

$$\% \text{ Lignin in Pulp} = \frac{\% \text{ Methoxyl in Pulp}}{0.148}$$

It was recognized that lignin determined by this indirect method will give maximum values but they are probably very nearly correct. Certainly they are sufficiently accurate for the present investigation, since the lignin remaining in the pulp, even with high permanganate number, represents but a small proportion of the total lignin as will be demonstrated. The experimental data brought out a consistent relationship between the permanganate number and lignin content calculated from methoxyl and this is presented in the curves in Fig. 3 for spruce and hemlock pulp.

In order to correlate sulphite waste liquor evaluation with the amount of wood cooked and pulp ob-

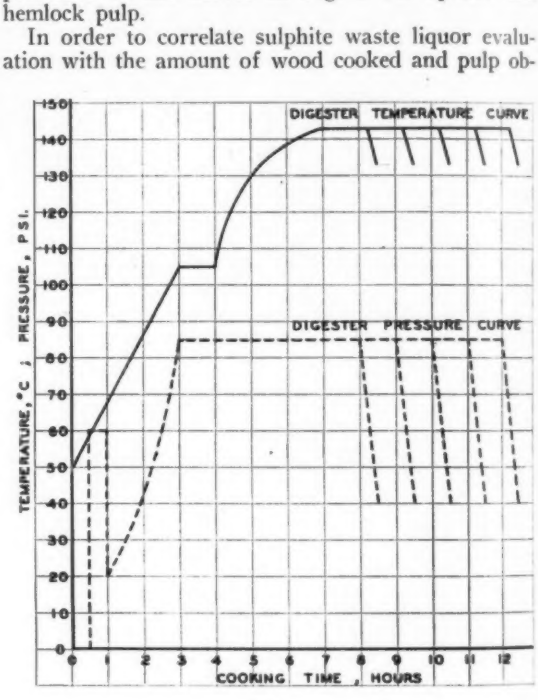


FIG. 2
Cooking Curve

tained, it was necesary to establish: first, how much sulphite waste liquor organic matter results from each cook, and second, how much lignin can be precipitated from a known amount of organics contained in a sample of waste liquor resulting from each cook. It might be expected that the difference between dry weight of the wood cooked and pulp plus screenings obtained, would constitute the total sulphite waste liquor organic matter. However, several exploratory cooks carried out with different cooking conditions consistently showed that a small part of the wood components will escape as volatile compounds (i.e., CO_2, methanol, cymene) *(4)*. The exploratory cooks showed that the nonvolatile sulphite waste liquor organics can be calculated as follows:

(100 parts dry wood minus parts total pulp) × 0.9 = parts total sulphite waste liquor organic matter

The strong sulphite waste liquor drainage from

each experimental cook was diluted with water to a concentration of 9% solids. These liquors were analyzed for calcium sulphate, sulphonic SO_3 and sulphonic Ca, and the organic content of the adjusted liquors obtained by deducting the values for these inorganic components from the total solids value. After thus establishing the sulphite waste liquor organics per cook and for a representative liquor sample from each cook, the theoretical volume of sulphite waste liquor with 9% solids resulting from each cook could be calculated. One liter of the 9% solids waste liquor from each sulphite cook was processed under standard conditions of time and temperature with slaked lime, as required in the lime precipitation procedure *(2)*. The lignin precipitate formed was filtered off, dried, weighed, and analyzed for lignin content by methoxyl determination, using the procedure and calculation already described for lignin in pulp. After deducting 20% of the calculated theoretical volume of sulphite waste liquor available for processing, the yield of precipitated lignin from each experimental cook could be determined on the wood basis.

Experimental Results and Discussion

The results reported herewith cover sulphite cooking of Eastern hemlock wood with systematic variation of maximum cooking temperature, cooking time, combined SO_2 and unreacted SO_2. (Note: The term "unreacted" used in this report is defined as the difference between total SO_2 and SO_2 as bisulphite in the cooking acid.) In addition, the cooking time for each set of pulping conditions was varied to cover a normal range of pulp bleachabilities. Consolidation of the large amount of experimental data obtained under such program to make them suitable for interpretation and practical conclusions was done the following way: For each set of cooking conditions, three or four cooks were made in which cooking time only was varied at a given maximum temperature.

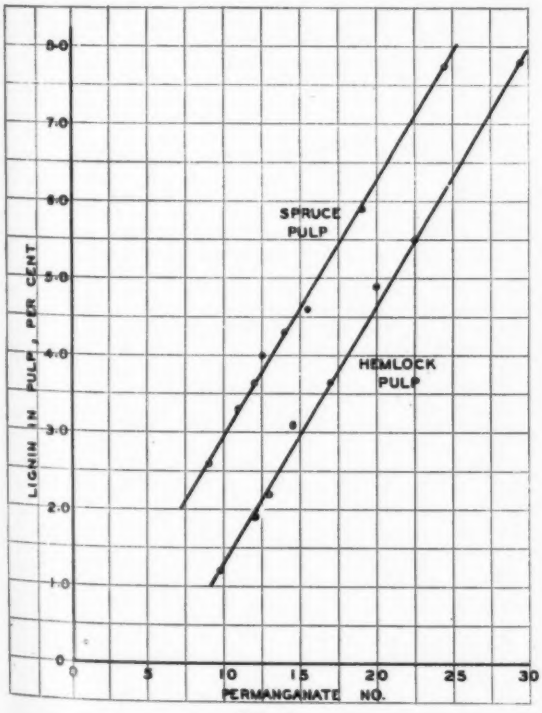


FIG. 3
Relation Between Permanganate No. and Residual Lignin in Pulp

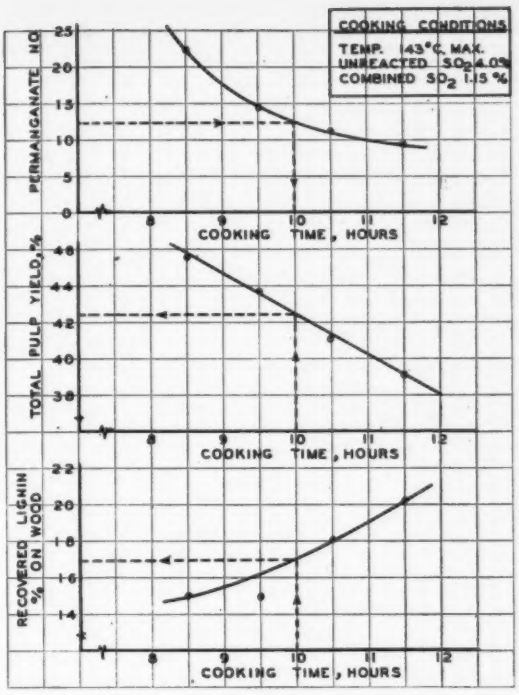


FIG. 4
Effect of Cooking Time on Permanganate No., Pulp Yield and Lignin Yield

After determining permanganate number, total pulp yield, and per cent lignin recovered from the sulphite waste liquor on wood basis, these values were plotted against cooking time used. Permanganate numbers 16.9, 12.7 and 8.4 were selected to represent high, medium and low bleachability pulps. The cooking times required to give these bleachability values could then be read off from the curve relating $KMnO_4$ number and cooking time for *the given set of pulping conditions*. When thus these cooking times were found, the chart relating total yield with cooking time was used to obtain total pulp yield. Similarly the recovered lignin yield *for the three specific bleachabilities* was obtained from the chart showing cooking time versus recovered lignin. Figure 4 illustrates this procedure. The dotted lines with directing arrows are drawn in to show as an example how data for the 12.7 permanganate number pulp are obtained.

In Fig. 5 it is then possible to read off the relationship between cooking time and unreacted or combined SO_2 in the cooking acid. Similarly maximum temperature can be read for a given acid when either one of the three bleachability pulps is desired. These curves show that cooking time can be substantially reduced when the unreacted is increased at a fixed combined of 1.15% SO_2 *5, 6, 7*). Further, that cooking time is almost the same when unreacted is 3% and combined varies within the range of 1.0 to 1.3% SO_2 *(8)*, and finally that cooking time is materially lowered when maximum cooking temperature is increased. In a similar way the composite curves in Fig. 6 show pulp yield on dry wood basis versus the individual pulping variables. Figure 7 shows the same sort of plots for yield of lignin precipitatable with lime when the sulphite waste liquor has been produced under the various cooking conditions. It is clearly evident that regardless of pulping conditions used, waste liquor from cooks producing

low bleachability pulps will yield more lime-precipitatable lignin than liquor from pulp having high bleachability. If pulp with higher bleachability is desired, then lower unreacted and also lower combined will give better lignin yield. Variation in maximum cooking temperature over the range studied is of minor importance for lignin yield.

Data are presented in Table I showing the per cent of total wood-lignin distributed as (a) lignin in pulp, (b) irrecoverable (dilute) sulphite waste liquor, (c) lime-precipitated lignin, and (d) process-effluent lignin. These values were obtained on cooks using hemlock and spruce wood. Cooking acid composition as well as maximum temperature were maintained constant but cooking time was varied to obtain the high, medium and low bleachability pulps.

TABLE I.—LIGNIN DISTRIBUTION ON COOKS PRODUCING PULPS OF DIFFERENT PERMANGANATE NUMBERS

1. Hemlock Wood			
Cooked with 4.00% unreacted; 1.15% combined; to 143° C. maximum temperature			
$KMnO_4$ No.	16.9	12.7	8.4
Cooking time, hours	9.2	10.0	12.0
Lignin distribution as % of lignin in wood, %			
In Pulp	4.7	2.6	0.9
Irrecoverable	19.1	19.5	20.0
Recovered	43.9	50.2	60.5
In effluent (by difference)	32.3	27.7	18.6
	100.0	100.0	100.0
Lignin to lime precipitation process, %.	76.2	77.9	79.1
Precipitation efficiency (lignin precipitated in % of lignin processed), %..	57.6	64.4	76.7
2. Spruce Wood			
Same acid and temperature schedule as above.			
$KMnO_4$ No.	16.9	12.7	8.4
Cooking time, hours	8.05	8.45	9.6
Lignin distribution as % of lignin in wood, %			
In pulp	9.3	6.4	3.9
Irecoverable	18.1	18.7	19.2
Recovered	40.7	43.4	46.8
In effluent (by difference)	31.9	31.5	30.1
	100.0	100.0	100.0
Lignin to lime precipitation process, %.	72.6	74.9	76.9
Precipitation efficiency (lignin precipitated in % of lignin processed), %..	56.0	58.0	60.9

These specific examples were selected because they represent cooking conditions and a range of permanganate numbers which are fairly normal for sulphite pulping.

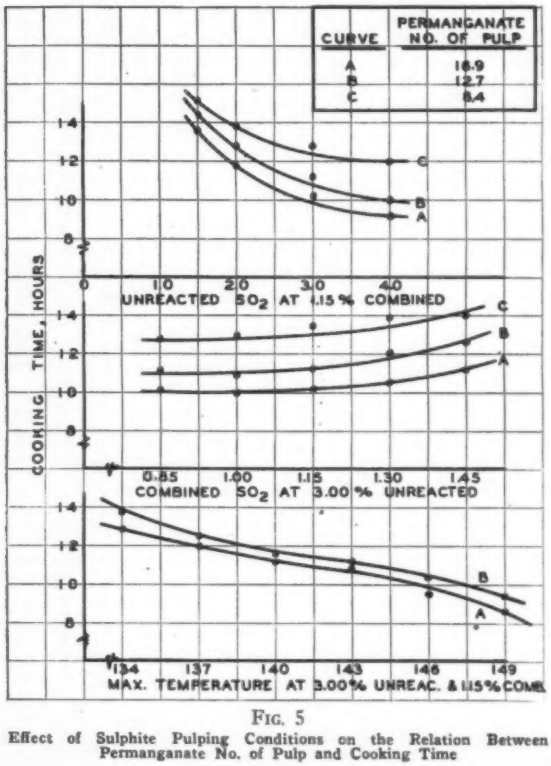


FIG. 5

Effect of Sulphite Pulping Conditions on the Relation Between Permanganate No. of Pulp and Cooking Time

It is evident that the part of the wood lignin which remains in the pulp is relatively small. Even for the highest permanganate numbers in the table, the pulp lignin is only about 5% of the total lignin for hemlock and about 9% for spruce. The differences in lignin content between hemlock and spruce pulp with the same permanganate number are illustrated in Fig. 3.

The figures given in the table for "irrecoverable" lignin—which represent lignin in sulphite waste liquor too dilute to process—represent a considerable part of the total lignin. It is obvious that means of improving blow pit and pulp-washing conditions so that the irrecoverable portion can be reduced, will increase the yield of lime-precipitated lignin on the wood or pulp basis. This problem of segregating pulp from sulphite waste liquor without causing undue dilution of the latter is of interest for all processes concerned with utilization of organic matter dissolved in the pulping process.

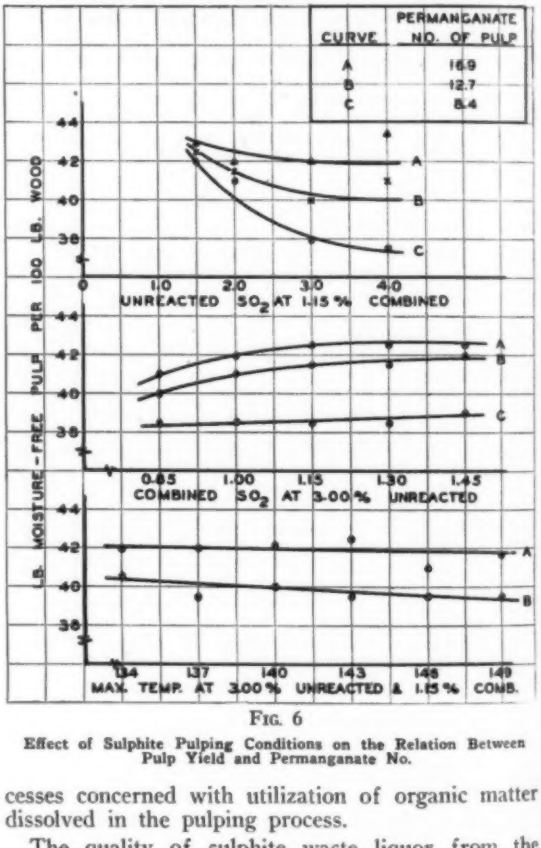

CURVE
PERMANGANATE NO. OF PULP
A 16.9
B 12.7
C 8.4
LB. MOISTURE-FREE PULP PER 100 LB. WOOD
1.0 2.0 3.0 4.0
UNREACTED SO_2 AT 1.15% COMBINED
0.85 1.00 1.15 1.30 1.45
COMBINED SO_2 AT 3.00% UNREACTED
134 137 140 143 146 149
MAX. TEMP. AT 3.00% UNREACTED & 1.15% COMB.

FIG. 6

Effect of Sulphite Pulping Conditions on the Relation Between Pulp Yield and Permanganate No.

The quality of sulphite waste liquor from the standpoint of the lime-precipitation process is given in Table I by the figures for lignin recovered and lignin in the process effluent. The term "precitation efficiency" represents the per cent lignin precipitated, based on the total lignin entering into the precitation process (recovered lignin plus effluent lignin). For hemlock the table shows that this precitation efficiency is 30 to 40% better with sulphite waste liquor derived from cooks producing pulp with permanganate number 8.4 compared with liquor obtained by pulping to 16.9 permanganate number. Spruce waste liquor shows the same trend but, for the range of permanganate number covered in the table, the increase in lignin yield is less pronounced with decreas-

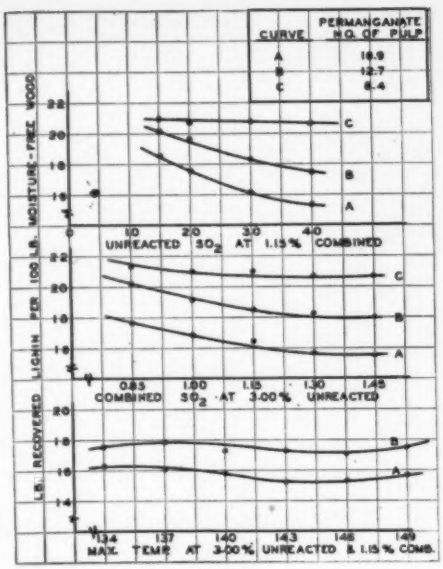


FIG. 7

Effect of Sulphite Pulping Conditions on the Relation Between Yield of Lime-Precipitated Lignin and Permanganate No.

ing permanganate number. It appears that under the cooking conditions investigated in this work, spruce cooked to 12.7 permanganate number gives sulphite waste liquor having the same lignin precipitation efficiency as sulphite waste liquor from hemlock cooked to 16.9 permanganate number. Note that the cooking time for these two pulps was about 9 hours in each case. Likewise spruce cooked to 8.4 permanganate number gives essentially the same lignin precipitation yield as hemlock sulphite waste liquor from 12.7 permanganate number. Again, these corresponding sets have actually about the same cooking time; in this case about 10 hours.

In summary it can be stated that the quality of sulphite waste liquor from the standpoint of completeness of lignin precipitation with lime improves with more drastic cooking conditions. For the same wood species this is directly related to the permanganate number of the resulting pulp.

It is intended through this presentation to make clear that the numerous experimental data required for elucidating the influence of cooking conditions on pulp and yield of precipitated lignin can be consolidated to give definite empirical information. This in turn will serve to establish the plant operating conditions which most efficiently produce the best sulphite waste liquor and pulp of the quality required.

Literature Cited

1. Howard, G. C., *Ind. Eng. Chem.* 26: 614 (June, 1934).
2. Howard, G. C., *Paper Trade J.* 103, No. 1: 1-2 (July 2, 1936).
3. Clark, E. P., *J. Am. Chem. Soc.* 51: 1479-1483 (1929).
4. Wise, Louis E., "Wood Chemistry," pages 702-713, New York, Reinhold Publ. Co., 1944.
5. McGovern, J. N., *Paper Trade J.* 103, No. 20: 29 (Nov. 12, 1936).
6. Holzer, W. F., *Tech. Assoc. Papers* 27: 276 (June, 1944).
7. Pittam, Wm., *Pulp Paper Ind.* 20, No. 7: 31-32 (June, 1946).
8. Yorston, F. H., "Studies in Sulphite Pulping," Bulletin 97, Dominion Forest Service, Ottawa, Canada.

Tappi Notes

Stewart V. Rogers, formerly of the Osborne Paper Mill Equipment Company, is now engaged in consulting practice at 305 Edward Bldg., Cincinnati, Ohio.

Kenneth L. Pike, formerly of Single Service Containers, Inc., is now production manager, Single Service Division, International Paper Company, 220 E. 42nd Street, New York, N. Y.

E. W. Deck, formerly of the Trent Tube Company, is now plant manager, Plant Chain Company, Div. Borg Warner, Ithaca, N. Y.

Curtis S. Walseth, formerly of the Institute of Paper Chemistry, is now in the technical department, Union Bag & Paper Corporation, Savannah, Ga.

Ernst F. Eckhoff of S. Haug Ellingsen & Company, Oslo, Norway is visiting in the United States.

Arthur B. Kaplan, chemical engineer for Milprint, Inc. has been transferred from Milwaukee to Stoughton, Wis.

J. A. Roslund has succeeded H. N. Hill as the official representative of the Asten Hill Mfg. Company in the Technical Association.

C. Lee Dryden, formerly of the Marathon Corporation, is now manager of Dryden-Harden Electric Company, Inc., Appleton, Wis.

C. Harry R. Johnson, is now general superintendent, Consolidated Paper Company, Monroe, Mich.

The TAPPI New England Section will meet at the Statler Hotel, Boston, Mass. on Friday, March 19th at 6:30 p.m. The program will be featured by addresses by Eric J. Harrison, General Manager of Harrison & Sons, London, England who will discuss "An Up to Date Picture of the British Printing Industry." Another speaker will be M. R. Andella, printing expert for the National Geographic Society. W. F. Gillespie, President of the Technical Association, will make a special visit to the Section on that evening.

The Western District, TAPPI Empire State Section, will meet on Wednesday, March 10th at 6:45 p.m. at the Prospect House, Niagara Falls, N. Y. T. Charest of the Fischer-Porter Company, Buffalo, N. Y. will discuss "Flow Metering; Recent Developments in the Paper Industry."

TAPPI Prepares Bigger Program

(Continued from page 68)

It is hoped that they will serve the operating men and provide short cuts in some types of laboratory work.

BOOK ON BLEACHING

For some time, the Pulp Purification Committee has had as its objective the publishing of a book on the bleaching of cellulose. There have been many difficulties to overcome but we believe that arrangements have progressed far enough that we can announce that the project is about to be actively launched. Dr. Emil Heuser will probably undertake the editing of the book. The pulp purification committee will actively cooperate. TAPPI feels that the contribution to the industry will be sufficiently great to underwrite the very considerable expense of the project. Obviously, it will take one to two years to complete the work—a book of possibly several hundred pages but, when finished, the feeling is that a complete, authoritative contribution to the industry will be available.

Ladies and gentlemen, this is a partial account of our present state and future hopes. Some of us feel it reflects a creditable showing. Many of you in the audience, by your contributions, have made this record possible. To you—TAPPI says, thank you. To you who may be new members, we ask your cooperation and your constructive thinking in helpinfg TAPPI to do the job it was organized to do, and in which many of us think it has been more than a little successful.

Tinker Praises Record of Robertson's Term

(Continued from page 39)

involved, it is necessary to review some of its predominant characteristics.

The primary pulp and paper industry employs 198,000 workers. In addition to mill workers 300,000 woods workers are dependent upon pulpwood operations for all or part of their income. 624,000 employes are engaged in the printing and publishing industries or in the production of paper products dependent upon the operations of the pulp and paper industry. The importance of this employment of 1,122,000 when measured against total employment in the United States is obvious. Average weekly earning in the primary pulp and paper industry is $53.91 as compared to an all industry average of $48.69.

In the business structure of the country, the pulp and paper industry is a substantial factor with its assets of approximately $3,600,000,000. The industry is unique in that it has the highest capital investment per worker of any manufacturing industry in the country, ($18,500). While the pulp and paper industry long since took its place as the sixth largest of our major industries, the fact that its sales were over $4,000,000,000 last year, which represented over 2½ percent of sales of all manufacturing organizations is not generally appreciated. Incident to this business, the industry paid some $325,000,000 in taxes.

Last year was considered a good year from the standpoint of profits within the industry. The distribution of the sales dollar is interesting because it reveals how far from a speculative enterprise the pulp and paper industry, over all, has progressed. In fact last year stockholders received in dividends only 2.9 cents of the sales dollar while approximately 8 cents of the same dollar was retained in the business as insurance of the continuity of the enterprise and its jobs and the expansion of the industry to meet requirements. The worker's share of the sales dollar approximated 20 cents or almost 7 times the dividends received by stockholders. The pulp and paper industry has been greatly concerned, not only with increased transportation costs, but with the maintenance of adequate transportation facilities. This is understandable when it is known that the freight bill of the industry involves approximately $500,000,000 per year or 7 percent of the entire freight revenue of the railroads.

The pulp and paper industry is becoming a major factor in forest conservation. The tremendous investments required for the establishment of manufacturing facilities and their immobility have made necessary consideration of adequate supplies of wood to give assurance not only of an economically accessible supply, but of a permanent supply. Over 15,000,000

E. W. TINKER
Lauds Robertson Record

acres of forest land is now in company ownership. Over 90 percent of this land is being held for permanent production of forest crops. In addition, an intensive educational campaign is being carried on to stimulate good forestry practices upon private land not in company ownership but upon which the industry is dependent. More and more paper companies are actively engaged in engineering their future wood supplies, balancing the cost of wood production under intensive forestry methods within close proximity to plants, against longer hauls with increasing transportation costs. It appears inevitable that the forestry enterprises of the pulp and paper industry will furnish an outstanding example of the solution of a problem of great public interest, as economic conditions permit private enterprise to undertake such a solution. The industry is gravely concerned with local, state and federal government moves that will create an environment unfavorable to private forestry operations.

In the field of international trade, the pulp and paper industry has serious concern. The domestic market for paper in 1947 and for many years before World War II created the greatest volume of dollar exchange of any United States market. The total of all purchases was over $660,000,000 or about 11 percent of the total dollar volume of all imports in 1947. Newsprint accounted for over $300,000,000 and wood pulp for $220,000,000. These data indicate the vulnerability of the pulp and paper industry to foreign competition. In its recent presentations before the Ways and Means Committee of the House of Representatives and before the Committee on Reciprocity Information, the industry did not attempt to judge the need for dollar exchange on the part of foreign countries or the desirability of international trade agreements. The industry representatives did, however, give a factual picture of the potential effects upon one of the country's major industries which effects upon our national economy can be judged from the facts I have previously outlined. Increasing knowledge of these facts on the part of our statescraft and the general public seems to be highly desirable.

The pulp and paper industry has taken the lead in an attempt to work out understanding and cooperative relationships with administrative agencies of the government. This has been done through the Pulp and Paper Industry Council to the Secretary of Commerce. It is true that because of the pressure of current problems, our consultations with Departmental officials up to this time have been largely of a defensive character. It is greatly to be hoped that working through this type of approach, we can obtain governmental understanding of the industry's characteristics, its progress and its difficulties, and in the final analysis develop plans for the industry's orderly development with the full understanding and cooperation of those government agencies that should be concerned with the industry's welfare which obviously coincides with the public welfare.

The consumption of paper and paperboard has been growing faster over a period of years than either the population or industrial production. The consumption of these products, in the year 1947, has reached an all-time high of some 25,000,000 tons or 342 pounds per capita. On the basis of long-time trends, of population growth and increased consumption, we can expect, under good business conditions, a requirement of about 30 million tons by the year 1955. These long-time trends would indicate that domestic production facilities would need to be expnded to an annual capacity of 25,000,000 tons by the year 1955. This involves a healthy growth which no doubt will be affected by the ups and downs of the business cycle and which might be seriously disturbed by international developments over which the industry has no control.

With the industry's growth in size and importance in the economy, it seems obvious we must assume increased interest in public affairs. We owe it to ourselves and to the public.

May I say that I have enjoyed my associations with you as President of the American Paper and Pulp Association over the past two years very much. There has never been a doubt in my mind at any time of the wisdom of your counsel or the general course we should follow in matters of policy affecting the activities of the Association. The industry owes you a deep debt of gratitude for the contribution you have made to its welfare over a difficult period through your sage counsel and intimate knowledge of the broad aspects of its business.

Seasonal and Geographical Variations in Tall Oil Composition*

By William H. Jennings[1]

Abstract

An analysis of tall oil samples from various mills in the Southern States obtained at monthly intervals indicated that geographical location is an important factor and that there are but little differences from cutting pulpwood at various seasons. Data are given.

Considerable work has been done towards determining the various properties of tall oil. However, a study of the published data reveals that the fatty acid content of tall oil varies from approximately 30 to 60%, rosin acids from 35 to 65%, and unsaponifiable matter from 4 to 10%.

In an effort to explain some of these large variations an attempt was made to determine the effects of geographical location and season of cutting of the pine trees from which tall oil is obtained.

A program was set-up in which 177 samples of black liquor skimmings were collected from various kraft pulp mills throughout the South at regular intervals and the tall oil obtained from these samples analyzed.

It was virtually impossible to obtain accurate information as to the date the wood was cut, exact time of storage, etc. However, in most cases the wood had been cut less than 60 days which is sufficiently accurate for the scope of this project.

Preparation of Samples

Before converting the samples of skimmings to crude tall oil all samples were washed twice with a saturated solution of sodium sulphate to remove entrained black

* Presented at the meeting of the TAPPI Chemical Products Committee, held in Asheville, N. C., Oct. 10, 1947.

[1] Member TAPPI; Manager, Chemical Division, Camp Manufacturing Co., Inc., Franklin, Va.

TABLE 1

Month	Analysis	South E. Virginia (3 mills)	North E. N. Carolina (2 mills)	South W. N. Carolina (1 mill)	E. Central S. Carolina (1 mill)	E. Central Georgia (1 mill)	South E. Georgia (1 mill)	South E. Texas (1 mill)
January		7 samples	2 samples	2 samples	2 samples	3 samples	3 samples	3 samples
	Rosin acids, %	39.6	41.3	42.1	46.3	46.5	48.3	47.6
	Fatty acids, %	55.2	52.9	51.2	46.3	46.4	44.7	47.1
	Unsaponifiable, %	5.2	5.8	6.7	7.4	7.1	7.0	5.3
	Acid Number	171.3	170.8	171.0	170.2	169.9	169.4	171.0
February		4 samples	2 samples	1 sample	1 sample	3 samples	3 samples	2 samples
	Rosin acids, %	39.2	40.9	40.7	46.7	47.1	47.0	46.5
	Fatty acids, %	55.9	53.8	53.2	47.2	46.1	46.4	46.4
	Unsaponifiable, %	4.9	5.3	6.1	6.2	6.8	6.6	7.1
	Acid Number	172.8	171.6	178.2	171.0	170.4	170.1	168.6
March		5 samples	2 samples	1 sample	2 samples	3 samples	3 samples	2 samples
	Rosin acids, %	40.0	40.9	41.6	45.4	45.8	48.1	45.9
	Fatty acids, %	54.9	53.4	51.5	47.9	47.5	44.8	48.2
	Unsaponifiable, %	5.1	5.7	6.9	6.7	6.7	7.1	5.9
	Acid Number	172.6	171.8	170.0	170.8	169.2	171.3	170.1
April		4 samples	3 samples		2 samples	3 samples	3 samples	2 samples
	Rosin acids, %	39.6	40.5		46.1	47.2	47.3	46.3
	Fatty acids, %	55.3	54.2		47.7	46.3	45.4	47.5
	Unsaponifiable, %	5.1	5.3		6.2	6.5	7.3	6.2
	Acid Number	171.8	171.2		172.0	171.2	168.9	170.6
May		4 samples	2 samples		1 sample	2 samples	3 samples	1 sample
	Rosin acids, %	39.6	40.8		45.9	47.2	47.6	46.6
	Fatty acids, %	55.3	53.9		47.9	46.0	45.4	47.4
	Unsaponifiable, %	5.1	5.3		6.2	6.8	7.0	6.0
	Acid Number	171.9	172.6		169.3	170.9	171.1	172.3
June		6 samples	3 samples			2 samples	3 samples	2 samples
	Rosin acids, %	38.9	40.3			45.1	48.0	45.8
	Fatty acids, %	56.3	54.1			47.8	45.0	48.1
	Unsaponifiable, %	4.8	5.6			7.1	7.0	6.1
	Acid Number	173.4	171.4			171.3	172.0	169.2
July		4 samples	3 samples			2 samples	3 samples	2 samples
	Rosin acids, %	39.1	40.7			46.8	47.1	47.1
	Fatty acids, %	55.6	53.4			45.9	45.9	46.5
	Unsaponifiable, %	5.3	5.9			7.3	7.0	6.4
	Acid Number	171.6	169.3			170.6	170.6	171.4
August		5 samples	2 samples			2 samples	3 samples	2 samples
	Rosin acids, %	38.8	40.5			47.3	51.2	47.2
	Fatty acids, %	55.6	53.6			46.5	42.5	45.8
	Unsaponifiable, %	5.6	5.9			6.2	6.3	7.0
	Acid Number	172.5	171.4			170.5	171.2	170.9
September		4 samples	2 samples			2 samples	3 samples	1 sample
	Rosin acids, %	38.9	40.8			48.2	49.6	48.0
	Fatty acids, %	56.0	53.5			45.0	43.0	45.3
	Unsaponifiable, %	5.1	5.7			6.8	7.4	6.7
	Acid Number	174.2	170.6			171.4	171.0	171.1
October		4 samples	2 samples			1 sample	2 samples	
	Rosin acids, %	39.3	41.2			46.8	48.2	
	Fatty acids, %	55.4	53.0			46.1	44.7	
	Unsaponifiable, %	5.3	5.8			7.1	7.1	
	Acid Number	170.3	171.0			170.8	169.3	
November		6 samples	3 samples			2 samples	3 samples	
	Rosin acids, %	39.1	40.6			47.3	47.9	
	Fatty acids, %	55.1	53.3			45.3	44.9	
	Unsaponifiable, %	5.8	6.1			7.4	7.2	
	Acid Number	171.1	170.9			170.5	173.0	
December		4 samples	2 samples		1 sample	2 samples	3 samples	
	Rosin acids, %	39.1	40.8		47.1	47.8	48.0	
	Fatty acids, %	55.5	53.3		46.2	45.3	44.9	
	Unsaponifiable, %	5.4	5.9		6.7	6.9	7.1	
	Acid Number	170.1	171.0		170.0	171.2	170.3	

liquor. On centrifuging, skimmings substantially free from impurities were obtained.

The purified skimmings were treated with an excess of 60% sulphuric acid, boiled for 1 hour, and allowed to settle. The tall oil was then washed with a saturated solution of sodium sulphate to remove any excess sulphuric acid and centrifuged. Any moisture present was removed by heating the tall oil to 220° F. under vacuum.

Analytical Procedure

The samples were tested in duplicate for rosin acids, fatty acids, unsaponifiable matter, and acid number using ASTM Methods. The modified Wolff method was used to determine the rosin acids number. On some of the darker samples it was impossible to see a clear cut color change of the thymol blue indicator. In these cases a pH meter equipped with Beckman "Type F" high pH electrodes was used. By running several tests on light colored tall oil using a pH meter in conjunction with the indicator it was found that the color changes took place at pH 3.0 and 9.6. Additional tests were made using the pH meter without the thymol blue indicator and the results checked against determinations using the indicator. In all instances the results compared favorably.

An analysis was made on four samples of tall oil obtained from different localities to determine any difference in the ratio of oleic, linoleic, and linolenic acids present in the fatty acid fraction. This procedure consisted of selective esterification of the fatty acid phase using anhydrous methyl alcohol in the presence of sulphuric acid as a catalyst. After esterification the mixture was disssolved in ether and the rosin acids saponified using 10% sodium hydroxide solution. The ether layer containing the methyl esters was washed several times with water to remove the final traces of rosin soaps, the ether evaporated, and the fatty acid esters obtained as a light yellow oil which in every case had an acid number of less than 1.5. The methyl esters were further purified by distillation under vacuum. The distilled esters were saponified with sodium hydroxide and washed several times with ether to remove unsaponifiable matter. The soap was converted to fatty acids by treating with 60% sulphuric acid, dissolving the liberated fatty acids in ether, distilling off the ether, and drying at 220° F. under vacuum. The iodine value (Hanus) and thiocyanogen number were determined and the percentage of oleic, linoleic, and linolenic acids present were calculated. No saturated acids were detected by the lead salt method. The results are shown in Table II.

TABLE II

Source	Month	% Oleic	% Linoleic	% Linolenic
S. E. Virginia.....	February	45	51	4
N. E. North Carolina....	February	43	54	3
E. Central Georgia.....	February	47	50	3
S. E. Georgia.....	February	46	50	4

Interpretation of Results

By studying Table I it will be noted that there is little change in the composition of tall oil due to the season of cutting. However, the rosin and fatty acid ratio indicate a definite change with geographical location.

The tall oil obtained from South Carolina and Georgia shows a considerable increase in rosin acids over that obtained from Virginia and North Carolina. There is also a definite increase in the percentage of unsaponifiable matter in the samples obtained from South Carolina and Georgia.

In view of the difference in the ratio of rosin and fatty acid content due to geographical location it is interesting to note that the percentage of oleic, linoleic, and linolenic acids present in the fatty acid fraction remained fairly constant regardless of source as shown in Table II.

From the results obtained by this preliminary survey it is believed that a more extensive program covering every section of the country in which skimmings are produced would be of definite value.

Kalamazoo TAPPI Discusses Water

M. C. Walker, Sales Supervisor of Ion-Exchange Products Division of the American Cyanamid Company was the principal speaker for the meeting of the Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry held on February 5th. His topic was "Water Treatment with Ion-Exchange Resins." Lee Mimms presided over the meeting while John Verdon of the American Cyanamid Company acted as program chairman.

Mr. Welker pointed out that water is used in greater volume than any other raw material in the paper industry, but it is mostly uncontrolled. Whereas most water for paper mill use today is filtered to free it from suspended solids, very little is treated with ion-exchange resins to free it from dissolved solids. This ion-exchange process for treating water for paper mill use is being used only in one paper mill today as far as he knows and that mill is making condenser tissue.

After his opening talk, Mr. Welker showed a moving picture entitled "Water, Water, Everywhere" which illustrated the chemistry by which ion-exchange takes place with ion-exchange resins. It also illustrated various applications found to date for these ion-exchange resins a good many of which were outside the field of water.

Following the movie, a small ion exchange resin unit was demonstrated on Kalamazoo River Water. A short discussion was also held at which time Mr. Walker revealed that this ion exchange process is an expensive one and is practical only on waters having less than 4,000 p.p.m. hardness.

During the business part of the meeting, Wm. Kirkpatrick of the Allied Paper Company presented two motions: firest, "That the Kalamazoo Valley Section of TAPPI be host to a regional meeting of TAPPI in the spring of 1949, the subject to be Coating; second, "That the local section of TAPPI go on record as approving the course in paper technology as established at Western Michigan College and pledging its support by a vote of confidence." Both motions carried unanimously.

Chicago Packaging Panel

In connection with the Chicago Technical Conference sponsored by the Chicago Technical Societies the TAPPI Chicago Section will conduct a panel discussion on Tuesday, March 23rd at 10:00 a.m. The panel chairman will be Harold R. Alley, chief chemist of the Mystik Adhesives Products Division, Chicago Show Printing Company. Charles L. Barr, vice president, F. B. Reddington Company, Chicago, will discuss the importance of mechanization in the packaging industry. Albert Kner, manager of the design laboratories of the Container Corporation of America, Chicago, will discuss the use of color in package design and Robert S. Dickens of Chicago will discuss the modernization of package designs.

In the afternoon Marvin C. Rogers, research director of R. R. Donnelly & Sons, Chicago, will lead a panel on four color press printing.

Cola G. Parker Elected To Head A.P.P.A.

(Continued from page 39)

On the occasion of his retirement as A.P.P.A. president, Mr. Robertson issued his report, as follows:

Let me confess that when I took over this gavel two years ago, I had only a mild appreciation of the scope and variety of the activities for which I was assuming responsibility. It has been a constant revelation to me to witness first hand the incessant parade of issues which in any proper perspective assume industry-wide proportions.

I think we are fortunate indeed in possessing a mature hierarchy of associations, culminating in the American Paper and Pulp Association, which permits us to assemble the full weight and experience of the industry whenever occasion requires.

Not the least task attempted during the past two years, has been the effort to improve and consolidate that structure. With the end of the war the question was raised as to the post war justification for some of the Association's activities and services.

The Board of Governors appointed from its membership a committee of four to investigate the whole range of Association activities, their relation to the activities of the divisional associations, their usefulness and their cost. Obviously it is in the interest of all concerned to avoid duplication of effort where duplication is found and to provide supplementary service where that need appears.

This committee has been at work for several months. Its task was large and it now has submitted its final report. Judging from the interim reports, the committee has studied the problems carefully and objectively and I am very sure has offered suggestions that will make more effective all cooperative effort within our industry.

Probably the problem most basic to the whole industry is that of wood supply. During the past two years the Association has continued its policy of promoting, in cooperation with other organizations such as the American Pulpwood Association, and the American Forest Products Industries, the adoption of Forestry and Wood Procurement practices which tend to preserve the nation's wood lands as a self-replenishing source of raw material. The Association has been especially active in attempting to open up new sources of wood as and when economic conditions permit. For instance, the Association this fall took the initiative in bringing together representatives of various interests; pulp and paper companies, who are potential users, the Forest Service and railroads, whose cooperation can and well may result in economic access to the vast stands of pulpwood species in the national forests.

Another problem common to all companies is that of industrial relations. The Association has for several years been evolving through its Industrial Relations Committee a comprehensive exchange of data pertinent to the major aspects of this problem.

It is gratifying to report that during the past two years, this service of the Association has received increasing favorable comment from both within and without the Association. It is now, I believe, a mature and permanent feature of the Association's program.

One of the major responsibilities of the Association lies in the field of public affairs.

Through our Washington office, our Public Affairs Committee and our Council to the Department of Commerce, we have tried to keep abreast of developments which might affect our industry and to take such action as occasion required. It is my hope that in view of the dramatic way the industry has expanded to meet postwar demands we will be able to escape the tentacles of bureaucratic controls.

The paper industry has always called for high capital investment per worker employed. Today this ratio is higher than ever before. In fact, I am advised that it is now $18,500—the highest in any industry. The responsibilities implicit in this ratio have brought men of very high calibre into the industry, executives and workers alike. Like Paul of Tarsus who proclaimed proudly, "I am a citizen of no mean city," I am very proud of the fact that I am connected with "no mean industry." The industry, as a whole, accepts with alacrity, its civic and national responsibilities, and can be relied on to cooperate freely and cordially in any program involving the public interest.

A number of specific problems in legislation have arisen, probably the most important was a series of bills for stream improvement, all of which, as originally written, would have subjected our operations to bureaucratic regulation.

In our presentations before Congressional committees considering these bills, we tried to make it clear that the industry appreciates the necessity for improving the conditions of many streams, but that in view of aggressive and constructive programs under way in many of the states we do not agree that the Federal Government should or can assume over-riding responsibility.

The form in which a committee bill emerged and was passed by the Senate, seems in large part an acceptance of our views.

During the past two years the Forest Industries Information Committee project, by which we attempt to keep public officials aware of the industry and its importance to the communities from which they come, has been enlarged and strengthened. We now have thirty-three committees in thirty-three states. The cooperation of the National Lumber Manufacturers Association and the American Pulpwood Association has become increasingly more active.

Statistics are often regarded as at best dull and often meaningless. Yet in these restless and confused times, it is impossible to operate without the knowledge they provide. No company can operate for long in a vacuum—it has to know where it stands competitively and where its industry stands in national and world scenes. Thanks to years of accumulation by the divisional associations and the American Paper and Pulp Association, our industry is able to maintain as complete a statistical program as any in the country. These figures have several times during my term of office, provided us with ammunition sorely needed to protect us from dangerous propaganda.

One of the results of the investigation by the Board of Governors' Review Committee has been to convince us that the reports we ask our companies to send in are important and useful. I cannot urge you too earnestly to continue your cooperation.

The post war years have witnessed an impressive expansion of paper making capacity. We have attempted to keep track of this expansion by repeated surveys of new capacity, the results of which have been widely distributed and are by now familiar to you all.

Some comentators have seen fit to deduce from these reports a prospect of over supply to be followed by the distress of the thirties which no one can forget. There are other indicators, however, which contradict the "Gloom Slingers."

Even if current demand for conventional paper grades should diminish, there are a multitude of new uses for paper waiting only on freer supply. It is not unreasonable to hope and expect that this deferred demand can take up such slack as develops, provided the price of paper remains competitive with other commodities seeking the same outlet.

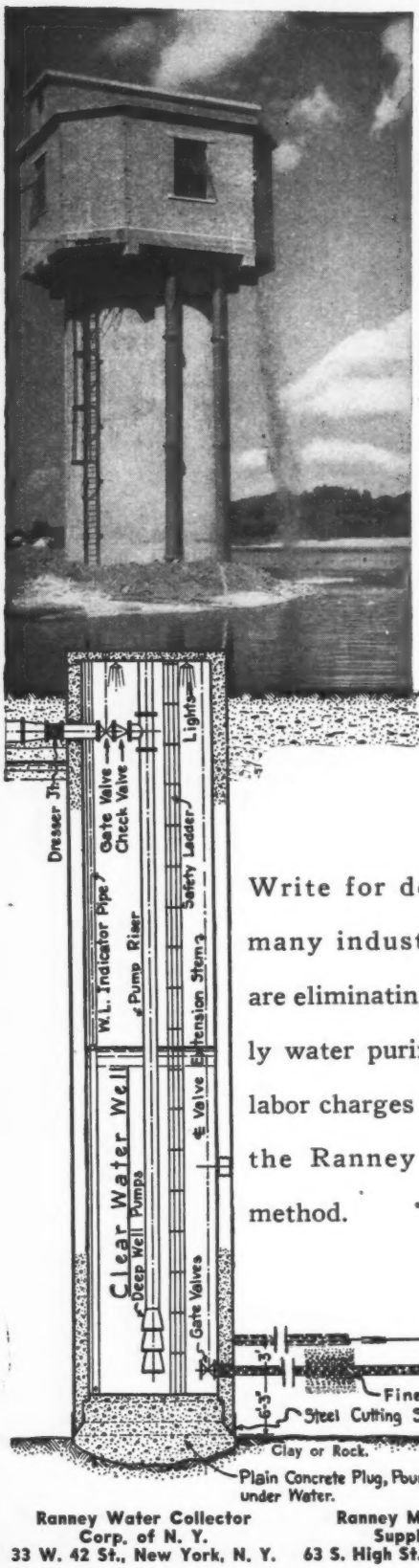
During the two terms of office in which I have had the honor of serving as your presiding officer, I have had regular contacts with the members of the Board of Governors — with the members of the executive committee and with the staff. I have found these contacts delightfully pleasant, stimulating and informative. I am deeply appreciative of the unfailing support and cooperation that have been given me in such full and generous measure.

More than ever before I feel that we can all be very proud of the type of men who are in positions of executive responsibility in our industry.

I am indeed grateful to the membership of the Association for the opportunity they have given me for a more intimate knowledge of the industry and the men who guide it.

I turn over to my successor, the presidency of the American Paper and Pulp Association, with its responsibilities, knowing it will be in good hands. He is fully aware of the effective organization available in the Association's administrative staff. I am sure he will have the same loyal and effective support that I have enjoyed.

Over 10 Million Gallons Per Day of Clear Water



Write for details how many industrial plants are eliminating their costly water purification and labor charges by utilizing the Ranney infiltration method.

Ranney Water Collector Corp. of N. Y.
33 W. 42 St., New York, N. Y.

Ranney Method Water Supplies, Inc.,
63 S. High St., Columbus, Ohio

DIGESTED

Here is something for you to tell the good church folks in America: "It is not enough to be good. We must also be strong." You can be good and be dead; to survive you must be strong. We have two obligations under the law; to observe the law and also to enforce the law. We can observe the law by being good. To enforce the law, either to prevent the crime or punish the criminal, we must be strong. And this applies not only on the community scale, but also on a nation-wide and world-wide scale. Some folks will say that it is un-Christian to use force. I say it is un-Christian not to use force. If we permit the criminal to violate the law with impunity and go unpunished, we share the guilt with the offender.

Evil is just as much at home in this world as good is.

To prevail and survive, we must be strong—Brig. Gen. WILLIAM E. BROUGHER, U.S.A. From an address before the Technical Association of the Pulp and Paper Industry.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1948		Corresponding Weeks—1947	
January 10	99.4	January 11	102.6
January 17	99.9	January 18	103.8
January 24	101.1	January 25	103.7
January 31	103.6	February 1	104.0
February 7 (revised)	99.2	February 8	106.2
February 14	*100.4*	February 15	104.5

COMPARATIVE MONTHLY SUMMARIES

1947							
Jan.	102.1	Apr.	105.1	Aug.	104.2	Dec.	101.5
Feb.	105.9	May	106.2	Sep.	102.0	Year Avg.	104.3
Mar.	106.1	June	106.0	Oct.	109.5	1948	
		July	93.5	Nov.	109.3	Jan.	*100.9*

COMPARATIVE YEARLY SUMMARIES

	1941	1942	1943	1944	1945	1946	1947	1948
Year to Date	87.0	104.1	87.6	88.7	86.8	95.2	104.2	*100.5*
Year Average	97.4	90.4	87.8	88.1	89.4	101.1	104.3	

NOTE: *As of January* 10 *capacity base increased by* 13.3%.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1948		Corresponding Weeks—1947	
January 10	99	January 11	102
January 17	104	January 18	103
January 24	104	January 25	101
January 31	103	February 1	102
February 7	100	February 8	104
February 14	*101*	February 15	102

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1947	99	103	101	100	101	101	90	99	96	101	99	89	98
1948	*99*												

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

EDITORIAL

TAPPI Takes Up New Problems

The PAPER TRADE JOURNAL is in complete agreement with President Gillespie's announcement that TAPPI publish its own Journal beginning January, 1949.

During the 27 years that the Tappi Section has been published by PAPER TRADE JOURNAL, there has never been any form of contract between these two dominant factors in the industry. This absence of any perpetuating contract was deliberate on our part because we felt and still do that Tappi should be completely free and unhampered in the conduct of their publications policy just as we insist that the PAPER TRADE JOURNAL be free and unhampered in the conduct of its operations.

When the Association first started their Section in the Journal and the membership was 346 there was no possibility of publishing a Tappi Journal. In the intervening years even while the publicity given by the Journal was the major factor in Tappi's growth, recurrent suggestions were being made that Tappi should have its own publication. Fully aware of these spasmodic convulsions, at no time did the Journal attempt to influence the choice of the members in any fashion. (In fact we have several times provided the Association with figures on publishing a paper should they so desire.)

During the year 1947 the Membership of Tappi passed the 3000 mark. The Executive Committee now feels that the income from this Membership is sufficient to afford their own paper. If conducted on the basis outlined to us it may be done; whether the members of the Association will agree that it is a suitable substitute for other services only time will tell.

PAPER TRADE JOURNAL is now in its 76th year of continuous publication. In the early years the Journal was of considerable aid in the formation of the American Paper and Pulp Association, generously giving space and publicity. Through the years we have felt that such aid to anything that might be of benefit to the industry is our responsibility. We have enjoyed being of particular service to Tappi during its struggle for recognition, stability and membership. We believe that these efforts have been part of the reason that the men who make paper hold the Journal in high esteem.

Should this new and major venture of Tappi require guidance for its initial faltering steps, we assure the members of Tappi that should our aid and experience be sought we will recognize our responsibilities to them and to the industry.

Cause of High Costs

More than an invitation—an argument, and a stiff one—was laid before a group of book designers and printers last week in Boston when Amor Hollingsworth, Jr., of Tileston & Hollingsworth told a selected audience exactly what they could do to help paper makers help them keep costs down. Goods that cost less to make can, and most often do, sell for less. And so long as he wants to buy for less the customer can exercise a dominant influence in the costing of the paper he uses.

Briefly, if a publisher will reduce the number of items of paper that he buys he will have taken a first step toward reducing his costs; he will keep from distributing his purchases over an expensive variety of production, and incidentally, will reduce his own investment in inventory, said Mr. Hollingsworth. But, even at the source his savings will begin—he will help the paper maker avoid losses that must occur when production is interrupted to change over machines, and cutters.

For example, a special color of white which must be matched will result in more waste while changing from a standard color during the time it takes for the previous order to run out and the time when the color man has the new order adjusted to match the desired shade.

The same sort of loss results from a special finish because the paper has to be broken down and rethreaded through a different number of rolls in the calender stack. When the man gets through making the change there will be a good deal of paper on the floor which will have to be taken back, repulped and made over again with consequent loss of time and production.

As a practical matter, the saving gets to the customers in the form of lower prices because, customarily, there is a lower price for a larger quantity. If a customer buys 1000 tons a year and only uses ten different items, he will be placing much larger orders than one who uses 50 different items. The first will average 100 tons of each item per year and the second will average only 20 tons of each item per year. One hundred tons would be about six carloads or one every two months. Twenty tons would be only a little over three tons every two months. The difference in cost between a carload and 6000 pounds is substantial.

Then he went on to talk about the customer's business. If, he said, the items are cut to a relatively small number, more books can be printed on the same size, weight and grade of paper. This will mean that a relatively small stock of paper at the printers or the paper mill will be useful for more purposes. There will be less paper waiting around because it was ordered for a particular book. If some other book of the same size is ready for the press sooner it can be used on that book. There will be no useless overruns of paper to be sold as waste paper back to the paper mill because they can be used on the next book if it takes the same size.

Finally, less working capital is necessary for a smaller inventory which turns over faster.

Rush Construction on New Intake Gates

HOLYOKE, Mass.—Working on a 24-hour daily schedule, the Daniel O'Connell's Sons Construction Company, has started the installation of the new intake gates at the Newton Paper Company.

This is part of the general program of the flood wall project, and between now and the end of the year, the process will be repeated at the Riverside Division of the American Writing Paper Corporation, Chemical Manufacturing Company, and all other mills in the vicinity between the Willimansett Bridge and Springdale where the dike is being erected.

City Engineer Edward A. Maher explained that the construction firm has worked out a schedule for this part of the necessary work with the manufacturers so that it will be done at a time when it's most opportune, since the mills will have their water powers cut while it is being done. For this reason, the 24-hour work schedule is going to be maintained, with the area flood-lighted at night.

Coffer dams will be set up both in the intake on the canals and at the outlets in the Connecticut River, wherever necessary. Sufficient water will be permitted to go through the mills for processing water and sewage. However, the amount for these two purposes is almost negligible as compared for power. It will be necessary, therefore, to have to tie in with power producing company lines to move their machinery.

NEW

—SAP BROWN—ALP—

Paper Color for that low cost brown paper either with or without toning colors

NOW

A reliable supply from
American Lignite
available in
Unlimited Quantities
and
Lowest Prices

Fast deliveries from Eastern Warehouses

AMERICAN LIGNITE PRODUCTS CO.
IONE, CAL.

Eastern agent—B.M. Snyder III
621 Cherry Street
Phila. 6, Pa.

N.P.T.A. Revises Order Of Its Convention

NEW YORK — The National Paper Trade Association has made changes in previous program sequence for the annual convention at the Waldorf, April 5-8. The opening feature of the first day, Monday, April 5, will be a luncheon in the Grand Ball Room at which there will be only one speaker of national prominence — to be announced. Reservations should be made in advance with the Association office for seats, or tables seating ten, which will enable members to accommodate their own people and invite mill men to be their guests.

Meetings of the governing and commodity committees of both divisions will be held Monday morning and the annual meeting of the board of directors in the afternoon. No other sessions are scheduled for that day.

The joint meeting of both divisions will be held Tuesday morning and divisional meetings will follow Tuesday afternoon and Wednesday morning. The Wednesday afternoon session will be devoted to the proposed Trade Practice Conference with a representative of the Federal Trade Commission in attendance.

The annual meeting, together with election of officers, closing the convention will be held Thursday morning, April 8.

Mando Awards $500 For Saving Idea

MINNEAPOLIS—An idea for substantially reducing shutdown time and replacement costs earned Fred Lahaie, machinist at the National Pole and Treating Plant, a division of the Minnesota and Ontario Paper Company, an award of $500, presented by L. C. Brooks, plant manager. This is the largest single payment accorded a Mando employe under the company's suggestion system initiated in 1945.

The winner, a veteran of 26 years service with the Company, developed an improved type flexible knuckle joint used in association with the multiple drills boring a series of spike holes in railroad ties. The life of the knuckle joint previously used was two months and its replacement caused considerable lost production time. Lahaie's innovation, experimentally installed five months ago, has yet to be replaced.

It is estimated by Mr. Guy H. Hamsey, General Manager of the National Pole Division, that Lahaie's idea will result in a total annual savings of about $5,000 to the Company.

Wisconsin Finds Use For Paper Mill Waste

MADISON, Wis. — The University of Wisconsin reports that three of its biochemists have discovered a new way to turn paper mill waste into a useful product. It is a method of using sulphite waste in the manufacture of lactic acid, a product used in the tanning, lacquer and food processing industries. The scientists are Reid H. Leonard, W. H. Peterson and M. J. Johnson. Their work was financed partly by a grant from the Rhinelander Paper Company, Rhinelander, Wis.

Under their process, excess sulphite is removed from paper mill waste by treating it with steam. Malt sprouts, blackstrap molasses and lactic acid can be recovered from fermented material by using solvents, Peterson said, but he added: "We can't be positive of its efficiency until we try extraction in a pilot plant." One advantage of the new process, he said, is that 95 percent of fermentable sugars in the waste are recovered in lactic acid. Other fermentation methods recover only about 50 percent of the sugars for salable products.

American paper mills, it has been estimated, dump 6 billions of gallons of sulphite waste liquor into rivers and lakes each year. Other methods already in use are the production of alcohol, fodder yeast and vanillin from waste in the manufacture of paper.

Dixie Cup Elects Dawson and Van Schaick

EASTON, Pa.—Cecil F. Dawson has been elected president of the Dixie Cup Company. Mr. Dawson is Chairman of the Executive Committee of the board and was formerly first vice-president. He has been a director for many years and has had experience in all phases of the company's operations.

C. L. Van Schaick was elected executive vice-president and a director of the Company to fill the vacancy caused by the recent death of Julian E. McGiffert. Mr. Van Schaick was formerly vice-president in charge of sales and has filled various posts in the production and sales departments during the past twenty years.

Thilmany Raises Scale

KAUKANA, Wis. — Hourly wage increases of three cents for women and from five to seven cents for men were announced February 20 at the end of negotiations between Thilmany Pulp and Paper Company and the International Brotherhood of Pulp, Sulphite and Paper Mill Workers and the International Brotherhood of Paper Makers, both AFL. The new base rate for women is 98 cents an hour and $1.11 for men. About 1,100 hourly paid employes are affected.

Macon Plant Started By Inland Container

MACON, Ga.—The new Macon plant of Inland Container, a Georgia corporation, located in the southeast section of the city, on the Guy Paine Road, near the Naval Ordnance plant, is completed and in operation. This addition to Macon industry is welcomed by the community, as it will integrate in Macon the complete conversion from tree to corrugated shipping container.

The Macon operation of the Inland Container Corporation will be one of the city's largest industries, eventually employing more than 400 people. This information was obtained this week in an interview with H. C. Krannert, president of Inland Container Corporation. He further stated: "With few exceptions, all employees have been selected from the Macon area."

Frank M. Talbot has been appointed sales manager, and Walter E. Davis, plant works manager. They now have taken up permanent residence in Macon.

Inland Container Corporation has six plants in the South and Middle West, and is one of the largest companies manufacturing corrugated shipping containers from southern kraft paperboard. With the strategic locations of its several plants, Inland Container Corporation is in a position to service both large and small users of shipping containers. Inland is the fifth largest manufacturer of shipping containers and in addition has the distinction of being the first company to manufacture corrugated shipping containers exclusively from paperboard produced in the South.

The Macon plant is of the most modern design, consisting of one floor construction with brick walls, steel sash, and steel trusses. It is sprinklered completely, fireproof throughout, and has ample light and ventilation for excellent working conditions. Every safety device has been provided for the protection of the employees, and the plant will offer a clean and pleasant working environment.

Adjacent to the Inland Container Corporation plant is the Macon Kraft Company paper mill, in which Inland Container Corporation and the Mead Corporation have joint interests. From pulpwood cut in the vicinity of Macon, the Macon kraft mill will manufacture kraft paperboard to be used by Inland in the manufacture of southern kraft corrugated fibre shipping containers.

Since the early '20's Inland Container Corporation has used exclusively in their product only virgin southern kraft paperboard, which is produced in almost every state in the South. They intend to continue all of their old sources of supply, and the new Inland plant and Macon kraft mill is part of their plan to share with the Macon community in the anticipated further growth of the container industry.

Much credit is due our Chamber of Commerce, and its Macon Area Development Committee, for their help in getting the Inland Macon plant constructed at this early date, for Mr. Krannert, in our interview, stated: "While we intended to eventually locate a container plant in Macon, we felt building conditions and costs were so difficult it would be wise to defer the matter for several years. However, we were convinced by your several civic organizations with whom we conferred, that it was important to Macon to start this industry at the earliest possible date. We are very glad now that we made this decision."

Inland Container Corporation officials stated that they were very much impressed with the Macon area and community because of the fine support that had been received locally. They believe that Macon and the State of Georgia have entered into a new phase of industrial activity and they are very pleased to be a part of this expansion program.

Kimberly Mill Group Aims at New Record

KIMBERLY, Wis. — The Technical Department of the Kimberly mill of Kimberly-Clark Corporation is now hoping to attain its thirty-fifth anniversary without a lost-time accident. That will be five years from now. The department celebrated its thirtieth anniversary on February 7.

John Catlin, Neenah, assistant technical director of Kimberly-Clark, told the workers in the department that their record is outstanding in Kimberly-Clark. The group, he said, provides a fine example for other departments to follow. He referred to recent accidents in other technical departments, and urged that workers be alert at all times.

Congratulations were offered to the department by Art Parker, acting mill manager, in the absence of J. T. Doerfler, who was on a vacation. A congratulatory message was sent by Glen Strieby, former technical director here and now at Neenah.

Much of the credit for the perfect record was due to William Van Hout, safety director at the mill, according to Art Bellinghausen, technical superintendent at Kimberly. Al Briggs, personnel director, also offered his congratulations.

Appleton Starts Course In Foreman Training

APPLETON, Wis. — "Do Supervisors Know What Business Is?" will be discussed by John P. Reeve of the Appleton Coated Paper Company at the first class in foremanship training at the vocational school here March 3. The classes, a series of seven, are sponsored jointly by the Industrial division of the Appleton Chamber of Commerce and the vocational school. They will be held from 2:30 to 4 o'clock each Wednesday afternoon.

Wisconsin Sets Up River Inventory

MADISON, Wis. — The Wisconsin Conservation Commission last week set up machinery for an inventory of river resources in the state, in preparation for a water conservation program.

The action is the direct consequence of the commission's frequent recent defeats in disputes with power companies and rural electric cooperatives. These disputes concerned hydro-electric exploitation of principal rivers. Henry P. Kramer, assistant conservation director, will supervise the work of a departmental committee in making the study, and Adolph Kanneberg, internationally known water power authority who recently retired from the commission's staff, will be invited to act as an expert consultant.

The commission approved addition of 24,500 acres of privately owned forest crop land, and rejected applications by private owners for addition of 1,508 acres under the law. The forest crop law provides that land can be listed and the owner pays 10 cents an acre to township in lieu of taxes. He must agree to reforestation under supervision of the Conservation department, which also contributes 10 cents an acre.

The state now has about 160,000 acres of privately owned land and about 2,000,000 acres of county owned land in forest crop areas. The commission approved entry of 38,814 acres of county land to the areas and rejected 11,000 acres. When a county enters land under the law the commission pays 10 cents an acre to the town and 10 cents an acre to the county.

The commission has not indicated whether it will establish a new limit on additional acreage. The original goal was 2,000,000 acres. If the total is enlarged, the commission probably will ask the next legislature for an additional appropriation.

Under the crop law, the forests are not cut until maturity, when the state, in return for its aid, collects a severance tax graduated according to current stumpage values.

In many northern countries, current sales from county forests prove the worth of the program. According to F. G. Wilson, superintendent of the cooperative forestry program, some northern county officials are anticipating the time when county forest income will be sufficient to allow the abolition of county taxes. Marinette county has the largest forest program. Income from stumpage sales now is sufficient to meet the bond payments on a new and modern county hospital built a few years ago.

Corrugated Profits Up

TORONTO — Corrugated Paper Box Company reports for 1947 a net profit of $231,636 or $4.45 per share, compared with $216,420 or $4.13 a share in the previous year. Net working capital is $986,073 against $922,691 a year ago.

Monsanto Resumes As Materials Arrive

SPRINGFIELD, Mass.—Arrival of raw materials previously tied up in transit because of bad weather has permitted the Indian Orchard plastics division of Monsanto Chemical Company, to recall more than 225 temporarily furloughed workers.

The majority of these employes have been idle since the middle of last week, while 45 have been on temporary layoffs since early this month, according to Carl T. King, production manager.

Mr. King said that 50 employes are still on a temporary furlough status because of lack of information on future deliveries of one essential raw material. In the absence of this information, he said, the company is operating the Lustron department below normal capacity to string out operating days to the utmost.

As soon as information assures future periodic deliveries of styrene monomer, operations will go back to the normal level and the remaining employes will be called in. Severe storms in upper New York state accounted for the exceptionally long delays in obtaining critical materials used in the manufacture of various plastics, forcing two major departments to close down.

Material arriving earlier in the week allowed the reopening of several departments, including the Lustron department, but lack of other materials then caused additional layoffs in the Resinox department. Employes in the first step of the Resinox operation have already started back to work.

Arkell & Smiths Adds Kelsey To Metropolitan Sales

CANAJOHARIE, N. Y.—Arkell and Smiths has added Cadwallader W. Kelsey to the Metropolitan New York sales office.

Mr. Kelsey served overseas in the United States Army Air Corps and was discharged with the rank of First Lieutenant. He has been connected with the Flintkote Company in the New York area, and since the war has been with the Kraus Research Laboratories. Kelsey attended Williams College and is now living in Greenwich, Connecticut. His office will be at 500 Fifth Avenue.

The addition of Mr. Kelsey to the sales organization of Arkell and Smiths is in line with the company's policy of expansion, which has added two multiwall bag manufacturing plants to its facilities within the last ten years. The latest addition is a multiwall plant in Mobile, Alabama. This plant will parallel the present manufacturing facilities at Wellsburg, West Virginia.

Minnesota Mining Distributes Profit

WAUSAU, Wis.—About $160,865 was distributed February 12 to employes of the Minnesota Mining and Manufacturing Company, makers of abrasive papers. Included were 258 employes of the Wausau plant. The money represented the company's quarterly profit sharing distribution. It is based on the company's net earning for the quarter ended December 31, 1947, according to W. L. McNeight, St. Paul president. Total distribution for 1947 was in excess of $707,000. During the twelve years the profit sharing plan has been in operation, employes have received nearly $4,500,000.

Employes entitled to full participation based on 30 months of service received amounts equivalent to 5.4 percent of their regular and overtime earnings received for the quarter just ended. Employes not fully participating received amounts based on their length of service. The plan is in effect for all permanent employes not participating in any other extra-compansation plan of the company.

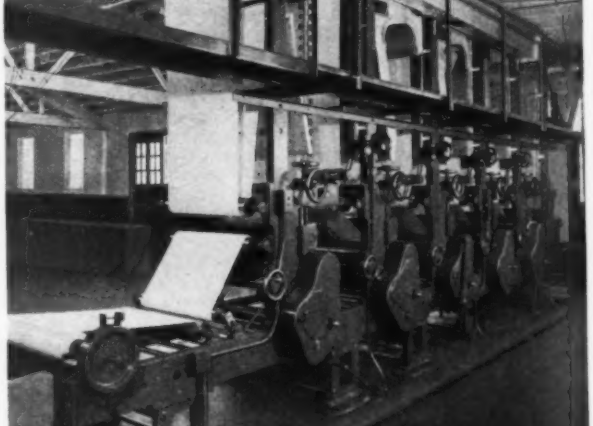
Of the total number of employes participating, 4,014 are employed at the main plant and general offices in St. Paul. Others participating are employed in the company's plants located in cities throughout the country.

INTRODUCING THE LATEST LINE OF ROTOGRAVURE PRESSES

Prints on all types of paper, carton board, foil and acetate film.

Prints in any number of colors. Solids or Half-Tones.

Prints on any width web desired, with 90 day delivery on standard sizes.



Illus. 26" 5-color with Plastic Coating Head.

Manufactured by The Precise Engineering Company, Chicago, Illinois. The Precise Gravure Press will meet the needs of Paper Mills and Convertors. It has all the qualities of sturdiness and high precision for excellent printing results but is simple in design and ease of operation. Interchangable cylinders cover a wide range. Motorized rams insure automatic and correct printing cylinder pressures. Speeds up to 500 feet per minute can be maintained with perfect register. Electronic equipment for web control is optional. In addition accessories for hot melt or plastic coating can be supplied. If you require other than a roll-to-roll press we can supply equipment for slitting, embossing, rotary die-cutting, sheeting or folding as an integral part of your press.

Write us at once for full particulars.

GIBBS-BROWER COMPANY, INC.

21 East 40th Street
Tel: Lex: 2-5759

Agents

New York, 16, N. Y.
"OUR 50TH YEAR"

FINANCE

U. S. Envelope Sales Topped Former Mark

SPRINGFIELD, Mass.—Sales for 1947 by the United States Envelope Company, were the highest in the company's history, and 16.9 percent above those for 1946, Eldon V. Johnson, president, said in his annual report to the stockholders made at the company's recent annual meeting here.

Net profit for the year ended last Dec. 31 was $1,085,775.79, after charging to operations $341,216.52 for depreciation on buildings, machinery and equipment, and after provision for federal income taxes of $997,000. Mr. Johnson's report said that total assets are $15,787,473.39, an increase of almost $3,000,000 over 1946.

Dividends paid during 1947 were $7 a share on the cumulative preferred stock and $10 a share on the common. A dividend of $3.50 a share on the preferred has been declared payable March 1, 1948, to stockholders of record on Feb. 28, and a dividend of $2 a share and a special dividend of $3 a share have been declared on the common, payable March 1 to holders of record on Feb. 28.

"This year marked another period of expansion and advancement for our company," Mr. Johnson said. "In spite of continued difficulty of obtaining raw materials, especially paper, to fill our needs, our production shows a slight increase over the previous year, and our backlog of orders indicates a healthy condition."

The company was employing more than 3,000 persons in 13 plants and three sales offices at the close of 1947, with total salaries and wages amounting to $8,322,711.12, an all-time high for the company and an increase of 12.9 per cent over 1946. One new plant, that in Doraville, Ga., began operation during the year. The plan to establish a plant in the Southwest has been held up due to high building costs. New high-speed machinery is being built as rapidly as possible to replace some of the older machines.

In preparing its annual report to stockholders this year, the company included recognition of the fact that 1948 constitutes the 50th anniversary of its incorporation. The company has mailed to its 3,000 stockholders and all customers and suppliers, a 40-page booklet containing, in addition to the financial report for 1947, material of interest and historic significance relating to the envelope industry, and the place of the U. S. Envelope Company, in that industry.

Donnacona Profits Up By 60 Per Cent

TORONTO—Net profits of Donnacona Paper Company for 1947 increased 60 percent over the previous year, the totals being $1,245,174, or $3 a share, compared with $776,155, or $1.87 a share. Net working capital was $3,646,752 against $4,423,973 a year ago. Sales were sharply higher at $12,474,847, compared with $9,540,551. The decrease of $777,221 in net working capital results from the financing of the purchase of 752 square miles of additional timberlands and pulpwood cutting rights at a cost of $2,410,461. Capital expenditure to properties during the year amounted to $789,327. Robert P. Kernan is president.

Union Bag Sales at New High in 1947

NEW YORK — Union Bag & Paper Corporation in 1947 maintained the annual upward trend in sales which began twelve years ago, with a total of $63,511,527, an amount 42 percent above the highest previous sales figure which was $44,871,180 in 1946.

Net earnings also set an all time high. Alexander Calder, president and chairman of the board, in the company's preliminary annual statement for the year ended December 31, 1947, reports net earnings of $11,756,608, equal to $7.93 per share on 1,483,298 shares of capital stock outstanding. This compared with $5,254,953 or $4.13 per share on 1,271,437 shares outstanding a year earlier.

"So far as the paper and paperboard industry is concerned," Mr. Calder stated, "the year was marked by strenuous efforts to increase production. Capacity had, by the end of 1947, moved up from the wartime figure of approximately 17,000,000 tons annually to about 21,000,000 tons — an increase of nearly 25 percent."

Noting that the company has taken aggressive steps to prepare for a more competitive market, and to strengthen its personnel and plant for the years ahead, Mr. Calder stated, "We largely completed the first postwar program of capital expenditures. This program was designed to reduce costs, to increase paper and bag capacity, and to add corrugated containers to our line of paper packaging products. It was substantially completed without recourse to borowing in 1947, and without impairment of the working capital position. These capital expenditures, including some plant acquisitions, totaled over $7,100,000 for the year.

"Working capital as of December

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending February 21, 1948

STOCKS

	High	Low	Last
A. P. W.	4⅛	4⅛	4⅛
Armstrong Cork Co.	45½	42¾	45½
Armstrong Cork Co., pf.	90½	89¾	90
Celotex Corp.	24⅜	23⅝	23⅝
Celotex Corp., pf.	19⅜	19	19
Certain-Teed Products Corp.	14½	14	14⅜
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	18½	17⅝	18
Champion Paper & Fibre Co., pf.	91	90	91
Congoleum Nairn Co.	30½	29⅝	30
Container Corp. of America	36¼	35½	35½
Container Corp. of America, pf.	....	....	....
Crown Zellerbach Co.	27⅞	27	27⅜
Crown Zellerbach Co., pf. 4.20	93	92¾	93
Crown Zellerbach Co., 4 pf. 4	104	102½	102½
Dixie Cup Co.	30½	29½	30½
Dixie Cup Co., A	50¼	50	50
Flintkote Co.	33¾	32¼	33
Flintkote Co., pf.	100½	100	100
Robert Gair	8	7⅝	7¾
Robert Gair, pf.	19	19	19
International Paper Co.	45⅞	44⅛	44⅜
International Paper Co., pf.	89½	88¾	88¾
Johns-Manville Corp.	37	35	36
Johns-Manville Corp., pf.	102	101	101
Kimberly-Clark Corp.	21	19¾	21
Kimberly-Clark Corp., pf.	95	92½	92½
Mac Andrews & Forbes	....	....	....
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	20	19½	19⅜
Mead Corp.	17⅜	17	17
Mead Corp., pf. 4¼	88	88	88
Mead Corp., pf. 2	....	....	....
National Container Corp.	12⅜	11½	11½
Paraffine Companies, Inc.	23	22¼	22
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	24⅞	22½	22⅞
Rayonier, Inc., pf.	31⅜	31	31⅜
Ruberoid Co.	56	56	56
St. Regis Paper Co.	8½	8⅛	8⅜
St. Regis Paper Co., pf.	80	79	80
Scott Paper Co.	42⅛	41	41
Scott Paper Co., pf.	92½	92½	92½
Sutherland Paper Co.	39½	39	39
Union Bag & Paper Corp.	29	28	28¼
United Board & Carton	12⅞	12⅜	12⅞
U. S. Gypsum Co.	97	93	96¾
U. S. Gypsum Co., pf.	172½	172½	172½
United Wallpaper	5	4½	4½
United Wallpaper, pf.	....	....	....
West Virginia Pulp & Paper Co.	39½	39½	39½
West Virginia Pulp & Paper Co., pf.	101½	100⅞	100⅞

BONDS

Celotex Corp., 3¼s '60	....	....	....
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	97¾	97½	97¾
Mead Corp., 3s '68	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending February 21, 1948

STOCKS

	High	Low	Last
Great Northern Paper Co.	41	39½	39½
Taggart Corp.	10⅜	10¼	10⅜

31, 1947, amounted to $14,744,380. The ratio of current assets to current liabilities was 4.7 to 1. Included in this working capital was the sum of $5,299,581, derived from the offering of 211,861 shares of common stock to the stockholders in the last month of the year. If these funds, raised by the equity financing and authorized by the board of directors to take care of certain capital expenditures in 1948, were deducted from net working capital, the resulting ratio of current assets to current liabilities of 3.4 to 1 would still have been entirely adequate."

Mr. Calder said that three things were notable about the makeup of total sales: first, multiwall bag sales, much of which represents new markets, showed a substantial increase; second, sheet and box sales became really significant factors for the first time, with a new container plant in operation in Savannah and contracts negotiated to purchase corrugated container plants in Trenton, New Jersey, and Chicago —as well as to acquire an interest in a plant in Jamestown, North Carolina; third, great restraint was exercised in the matter of price. "Demand was so strong," Mr. Calder said, "that prices could have been raised, in most cases well above the levels at which our products were sold. We felt that our long term interests, as well as the national economic interest, would best be served if we held our unit profit margins well below what the traffic would have borne. We believe this policy has built good will for the future."

Foreseeing some recession in the not too distant future from the high plateau of production and employment which has governed the American economy since 1940, Mr. Calder expresses the belief that enough of the war-deferred demand for many industrial products has been filled to cause expectation of at least the beginning of some recession in the general rate of production within the coming year.

"If this happens," Mr. Calder stated, "we in the paper industry will encounter the first stages of a more competitive market — normally accompanied by price cutting and lowered profit margins in some lines. We have been preparing for this eventuality. Our sales force is ready to cope with a changed situation. Manufacturing costs are being watched today as though profit margins were back at recession levels. Much more important than such a cyclical downturn, in 1948 or any later year, is the long-run prospect of good business, on the average, over the next five to ten years.

Increase in the population, higher per capita consumption of most goods, improved productivity, better political management—all these things, we believe, will carry the American economy to new highs in the coming years.

Capital expenditures which we have made in 1947, and have planned for 1948 and 1949, will by reducing our costs, increase our earning capacity materially on the basis of current prices."

The company strengthened its pulpwood position by adding considerable acreage in 1947.

The company's 10-year 2¼ percent bank loan was reduced as of December 31, 1947, to $3,350,000. There is a balance of $6,500,000 available under this loan agreement with J. P. Morgan & Co., Inc., and a group of banks. The company, in order to finance further plans for cost reducing equipment, offered in December, 1947, rights to stockholders to purchase 21,861 shares authorized but not heretofore issued. Net proceeds amounted to $5,299,581.

Based on the average number of employees during the year, the company's provision for Federal taxes, amounts to $1,313 per employee. The highest annual payroll in company history totaled $15,305,427.

As of December 31, 1947, Union Bag & Paper Corporation had 7,321 stockholders of record.

Mando Pays 50 Cents

MINNEAPOLIS—Declaration of the common stock dividend of fifty cents per share payable April 20, 1948 to stockholders of record at the close of business March 31, 1948, was made known last week by Donald D. Davis, President of the Minnesota and Ontario Paper Company.

What do you know about Paper?

DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, Sales Manager

BRADFORD WEST, Pittsfield, Mass.
WILLIAM N. CONNOR, Jr., Canton, Mass.
L. H. BREYFOGLE, Kalamazoo, Mich.
WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash.
L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 1 — Paper is made in 37 States of the Union

Skillman Points Out Recreation Advantages

SPRINGFIELD, Mass. — "Recreation is the only known common meeting ground for management and employes," R. C. Skillman, president of the Industrial Recreation Association for American Industry and director of public relations for the Champion Paper & Fibre Company, of Hamilton, O., informed representatives to the third annual Eastern Industrial Recreational Conference during a three-day program at Hotel Kimball.

Summarizing the ideas which have been advanced during the course of the conference sessions, President Skillman emphasized that recreation provides a medium for common service and mutual understanding between the managerial and laboring groups.

Skillman pointed out that the employe recreation program is too narrow in many instances and must be broadened to take care of the needs of persons of all ages, including the children of workers and pensioned employes. This, he said, will offer leisure time relaxation for people not able to participate in active sports.

"If we can improve the use of leisure time," he said, "it will bring closer understanding between management and employes and will also make for better protection and working facilities."

President Skillman also stressed the need for more social and cultural activities in preference to too much emphasis on athletics. Athletics are an important part of the recreational program, he said, but should not be allowed to detract from the other activities which interest a wide range of the employe grop.

"There is entirely too much emphasis on athletics in industrial recreation programs," he said, "and actually there is no room at all for a varsity team. hTat rightly belongs in the advertising department. Not more than 15 percent of the workers are sufficiently young in years to enter into athletics."

Nekoosa-Edwards Directors Declare First Quarter Payment

PORT EDWARDS, Wis. — Directors of Nekoosa-Edwards Paper Company have declared a first quarter dividend of 25 cents a share, payable March 31 to stockholders of record on March 19, it was announced February 19 by John E. Alexander, president and general manager.

Mr. Alexander said that, while it is still too early in the year for a detailed 12-month forecast, the demand for Nepco products apparently is holding steady and strong, and that another good year is expected.

Last year, the company paid regular dividends of 25 cents a share for each of the first two quarters, a 25-cent regular and 25-cent special dividend for the third quarter, and 25 cents plus a special dividend of 50 cents for the fourth quarter.

Pulp Consumers Hear Of German Industry

NEW YORK — At the seventh annual meeting of the Association of Pulp Consumers, Inc., held at the Waldorf-Astoria on Thursday Major Harold L. Hamilton, USA, formerly Chief of the Pulp and Paper Section of the Office of Military Government in Germany, gave an interesting off-the-record talk on the German pulp and paper industry.

Hugo H. Hanson, president of the Association, reviewed the new program of the Association which had been put into effect during the year. He expressed satisfaction with the progress which had been made and emphasized the need for continued cooperation of the members in carrying forward this program.

Karl A. Clauson, secretary of the Association, stressed in his report to the members, the need for cooperation between the consumers and producers of market wood pulp. He stated that with a membership totaling 178 corporations operating 286 paper mills, the Association represented the non-integrated portion of the industry who are vitally dependent upon the availability of market pulp.

Discussing the wood pulp supply picture, he pointed out that 44 percent of the available market pulp during 1947 came from domestic production, 29 percent from Canada, and 27 percent from Scandinavia. Inventories of market wood pulp were 50 percent higher at the beginning of 1948 than they were a year previously.

In reviewing the future pulp supply picture, Mr. Clauson outlined the current Scandinavian developments which he observed during his recent visit to Europe. He also gave a resume of the domestic and Canadian outlook and the possibilities of an Alaskan pulp development.

Directors elected to serve three years: G. E. O'Connor, president, Mohawk Paper Mills; A. F. Owen, general manager, Latex Fiber Industries Co., Inc.; B. I. Reider, president, Victoria Paper Mills Co.; S. B. Surphin, president, Beveridge Paper Co.; R. L. Vayo, manager of Pulp Department, St. Regis Paper Co.

These five men will serve with the following ten directors whose terms continue: William Beckett, The Beckett Paper Co.; F. G. Bemis, Bemis Bro. Bag Co.; E. E. Grant, Crystal Tissue Co.; Hugo H. Hanson, W. C. Hamilton & Sons; Hale Holden, Jr., Byron Weston Co.; Dwight G. W. Hollister, A.P.W. Products Co., Inc.; Joseph S. Miller, New Haven Pulp & Board Co.; A. K. Nicholson, Hollingsworth & Vose Co.; Harry C. Sackett, Alton Box Board Co.; N. H. Sandberg, Waldorf Paper Products Co.

Provincal Papers Lifts Fine Prices

TORONTO, Ont.—In a letter to the trade last week Provincial Papers, Ltd., announced that effective March 1, prices for fine papers would be increased. The amount of the increase was not stated, but the announcement brought an immediate protest from publishers of national magazines, business papers and farm publications. This will be the sixth increase in fine papers prices since controls were lifted early in 1946.

Provincial Papers, Ltd., is one of Canada's largest producers of fine papers. Up to mid-week no announcement had been made by any of the other three principal producers of fine papers. The other leading producers are Howard Smith Paper Mills, Ltd., Holland Paper Co., and the E. B. Eddy Co.

No comment was available from officials of the other three mills, but in the past all producers have followed the same price changes.

"Since the first of the year the Canadian price of most pulps has increased to the extent that by March 1 the aggregate increase will be at least $15 a ton," the Provincial Papers letter states: "Until the end of the year (1947) the Canadian price had been held substantially lower than the United States and world levels. But since the final abandonment of distribution controls last Dec. 31, the price has risen to a point slightly below parity with prices that can be obtained elsewhere. Pulp is our most important material.

"With few exeeptions our basic price for M. F. roll paper has remained unchanged from April 28 last. There were some increases in finishing differentials effected in October, but there are many other items of increasing cost for which no provision has been made until now. Furthermore, our prices generally, after giving effect to the present advance, will have been increased substantially less than for most comparable commodities."

The New York market price of Canadian bleached sulphite pulp (a major item in fine paper cost) is now $125 a ton, an increase of $10 since Jan. 1. This is between two and 2½ times the 1939 price of $50-54 a ton. The domestic Canadian price of No. 1 bleached sulphite for one large Canadian mill has risen from $75 a ton delivered, (its ceiling price in force from 1942 to April 1, 1946) to a current price of $130 a ton established last Nov. 1, or a total increase of over 73 percent.

Wage rates in 1946 in pulp manufacturing were up 62.8 percent and in paper other than newsprint up 47 percent over 1939 levels. Dominion Bureau of Statistics indicates they may be up another 15 percent, which would put them up now around 86 percent

and 67 percent respectively above the 1939 level.

Heads of the three associations representing the periodicals of Canada have voiced their protest against the latest price increase and the policy of the mills in giving such short notice of advances.

Charles Sauriol, president of the Magazine Publishers' Association of Canada, states:

"Magazine publishers across Canada are appalled by prospects of another increase in fine paper prices to become effective with less than two weeks' notice. Similar notices from the paper making industry have resulted of late in a series of frequent price increases, so similar in pattern and degree, that no matter where publishers might turn they could find no relief from being steadily and surely squeezed towards a position of 'profitless prosperity.'

"The publishing industry is not in a position to absorb another price increase. If all book and magazine papers actually purchased by representative national magazines of Canada during the 20 years ending 1946 had cost one cent a pound more, the aggregate profits of those magazines for the two decades would have been completely wiped out. Based on a study of inescapable costs in the production of fine printing we know the maximum that the magazine publisher can afford to pay for his principal production ingredient, namely paper. When paper costs rise above that level of safety the publisher immediately finds himself faced with a serious economic problem. Since the ending of price control fine paper used in Canadian magazines has increased by 2.75 cents per pound at the mill, plus the jobbers' margin—an indication of the serious problem facing this section of the press of Canada.

"The paper industry seems to be of the opinion that whenever its members raise their prices, the publishers need only follow suit promptly and enforce a higher advertising rate upon advertisers. This thinking bears little relationship to reality. Advertising budgets of national companies are fixed a year in advance and cannot be increased to cover higher rates unless adequate notice is given. Already publishers are being squeezed by previous increases in the price of paper. They have, in many cases,increased rates to advertisers sufficiently to cover their higher costs for paper. Rates are largely fixed for the current year and the higher paper prices now announced will seriously affect their ability to render to advertisers and readers the important national service which is their function and duty."

Gerald L. White, president of Business Newspapers Association of Canada, says:

"The suggestion of increases in the price of paper during the last few years has resulted in current levels which are a matter of grave concern to business publications. As press runs are increased to enable publications to render effective service in the growing Canadian economy, paper becomes an ever larger factor in their budgets.

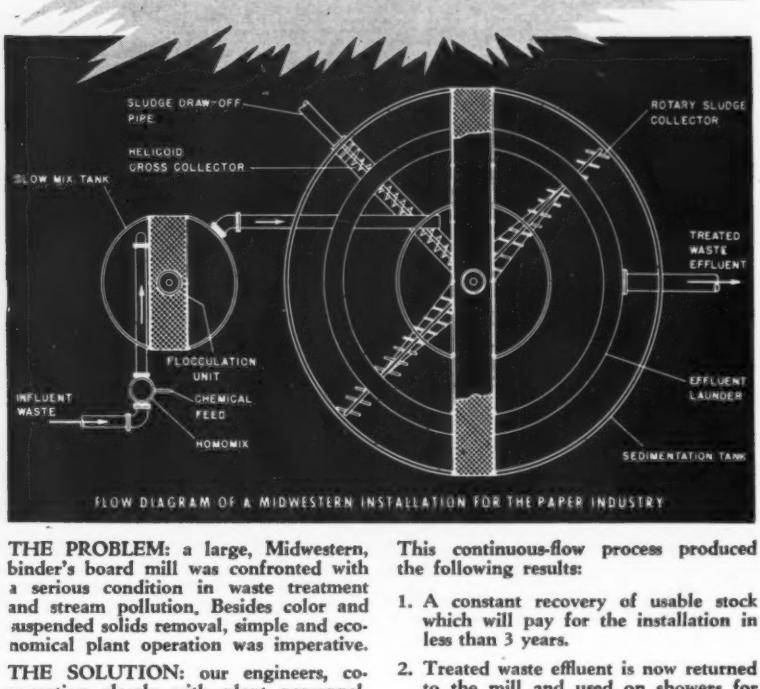
"Rising costs have been commonplace in every department of publication production but even under these conditions the percentage increase in paper makes it stand out from the rest. The very comfortable theory that increases in costs can always be passed along to the next link in the business chain does not work out easily in the case of the publishing industry. Business publishers are finding that many companies are unwilling to expand advertising budgets to meet increases in space rates. This is undoubtedly only one manifestation of an increasing pressure for some check in rising price levels.

Donald V. MacLeod, president of the Agricultural Press Association of Canada, states:

"The periodic and continued increases in the cost of printing paper have reached a point where this further increase constitutes a serious problem for publishers. Publishers have gone the limit in absorbing the sharp increases in costs which they have had to meet, particularly in the past two years. There have been increases in paper costs running the price up to as high as approximately 75 percent over what they had been. The seriousness of this situation is evident."

American Well Works

SOLVES CRITICAL WASTE TREATMENT PROBLEM!



FLOW DIAGRAM OF A MIDWESTERN INSTALLATION FOR THE PAPER INDUSTRY

THE PROBLEM: a large, Midwestern, binder's board mill was confronted with a serious condition in waste treatment and stream pollution. Besides color and suspended solids removal, simple and economical plant operation was imperative.

THE SOLUTION: our engineers, cooperating closely with plant personnel, made a thorough analysis of all factors involved. A treatment plant, fully equipped by AMERICAN, was installed. As diagramed above, it incorporated a unique, rapid chemical mixer, the *AMERICAN HOMOMIX.*

This continuous-flow process produced the following results:

1. A constant recovery of usable stock which will pay for the installation in less than 3 years.
2. Treated waste effluent is now returned to the mill and used on showers for machine felts.
3. Low annual cost and simple operation.
4. A serious stream pollution problem was solved and requirements of the pollution control authorities were met.

Our staff of Sanitary Engineers will cooperate with industrial and operating engineers in suggesting the process of treatment and type of equipment best suited to individual needs.

AMERICAN WELL WORKS

IN OUR 80TH YEAR
114 North Broadway
AURORA, ILLINOIS

Pumping, Sewage Treatment, and Water Purification Equipment
RESEARCH · ENGINEERING · MANUFACTURING

Offices: Chicago • New York • Cleveland • Cincinnati • Kansas City • Sales Representatives throughout the World

IMPORTS

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 21, 1948

SUMMARY

Newsprint	6483 rolls
Wallpaper	19 cs., 18 pkgs.
Wrapping Paper	504 rolls, 43 bls.
Printing Paper	1 cs.
Coated Paper	1 cs.
Paperhangings	4 bls., 5 cs.
Tracing Cloth	18 cs.
Gummed Paper	52 cs.
Tissue Paper	77 cs.
Jacquard Paper	1 cs.
Strawboards	21 bls.
Rice Paper	6 cs.
Fibre Boards	8 bls.
Parchment	1 cs.
Sulphite Paper	2056 rolls
Wafer Paper	11 cs.
Drawing Paper	3 cs.
Photo Paper	6 cs.
Filter Paper	25 cs.
Miscellaneous Paper	3009 rolls, 7 cs.

NEWSPRINT

Montmorency Paper Co., Brigus, St. Johns, 1758 rolls, 1803 rolls to Washington, D. C.

Malmar Paper Co., Tucson Victory, Genoa, 598 rolls.

Gilman Paper Co., Vretaholm, Gothenburg, 150 rolls.

Malmar Paper Co., Madaket, Rotterdam, 144 rolls.

N. Y. World Telegram, Stuart Prince, Cornerbrook, 987 rolls.

Gilman Paper Co., Stuart Prince, Cornerbrook, 118 rolls.

Clinton Paper Co., Stuart Prince, Cornerbrook, 803 rolls.

Malmar Paper Co., Aaldyk, Rotterdam, 122 rolls.

WALLPAPER

E. Linde, Inc., Vretaholm, Gothenburg, 1 cs.

Continental Bank Trust Co., West Linn Victory, Rotterdam, 18 pkgs. (hand painted).

Gailly Hartig, Wisconsin, Havre, 18 cs.

WRAPPING PAPER

The Borregaard Co., Inc., Vretaholm, Gothenburg, 450 rolls, 43 bls.

Sterling National Bank Trust Co., Vretaholm, Gothenburg, 54 rolls.

PRINTING PAPER

Stevens Nelson Paper Corp., American Farmer, London, 1 cs.

COATED PAPER

F. P. Gaskell Co., American Traveler, Glasgow, 1 cs.

PAPERHANGINGS

W. H. S. Lloyd & Co., American Farmer, London, 4 bls., 5 cs.

TRACING CLOTH

Keuffel & Esser Co., American Traveler, Manchester, 18 cs. (cotton).

GUMMED PAPER

B. F. Drakenfeld & Co., Inc., American Forwarder, Liverpool, 52 cs.

TISSUE PAPER

B. F. Drakenfeld & Co., Inc., American Traveler, Liverpool, 77 cs., 2 cs. (samples).

JACQUARD PAPER

Trocorna, Inc., Drottningholm, Gothenburg, 1 cs.

STRAWBOARDS

Chase National Bank, Vinkt, Antwerp, 21 bls.

RICE PAPER

J. E. Bernard & Co., Koloa Victory, Shanghai, 6 cs.

FIBRE BOARDS

Fibre Case & Novelty Co., Drottningholm, Gothenburg, 8 bls.

PARCHMENT

Andrews Paper Co., Queen Mary, Southampton, 1 cs.

Gerhard & Hey, Queen Mary, Southampton, 1 cs.

Meadows Wye & Co., Queen Mary, Southampton, 1 cs.

SULPHITE PAPER

Cromwell Paper Co., Vretaholm, Gothenburg, 152 rolls.

Green Kriegsman Paper Co., Vretaholm, Gothenburg, 255 rolls.

Resolute Paper Products Corp., Drottningholm, Gothenburg, 102 rolls.

Bleyco Paper Corp., Drottningholm, Gothenburg, 954 rolls (unbleached).

J. B. Lynch, Drottningholm, Gothenburg, 99 rolls.

Parsons & Whittemore, Inc., Drottningholm, Gothenburg, 222 rolls.

Green Kriegsman Paper Co., Drottningholm, Gothenburg, 270 rolls.

Paper Converting Machine Co., Drottningholm, Gothenburg, 2 rolls.

WAFER PAPER

Delft Packing & Trading Co., Noordam, Rotterdam, 11 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., Belle of the Sea, London, 2 cs.

J. E. Bernard & Co., Belle of the Sea, London, 1 cs.

PHOTO PAPER

(———), American Farmer, London, 2 cs.

(———), Belle of the Sea, London, 4 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Belle of the Sea, London, 25 cs.

MISCELLANEOUS PAPER

F. C. Strype, Vretaholm, Gothenburg, 153 rolls.

Resolute Paper Products Corp., Vretaholm, Gothenburg, 299 rolls.

Metz Paper Co., Vretaholm, Gothenburg, 311 rolls.

Stevens Nelson Paper Corp., Queen Mary, Southampton, 2 cs.

Sterling National Bank Trust Co., Drottningholm, Gothenburg, 81 rolls.

National City Bank, Drottningholm, Gothenburg, 549 rolls.

New England Supply Co., Drottningholm, Gothenburg, 1444 bdls.

Green Kriegsman Paper Co., Drottningholm, Gothenburg, 172 rolls.

Stevens Nelson Paper Corp., American Farmer, London, 5 cs.

RAGS, BAGGINGS, ETC.

E. J. Keller Co., Inc., Jericho Victory, Calcutta, 175 bls. jute rags.

Manufacturers Trust Co., Davidson Victory, Antwerp, 308 bls. jute waste.

Darmstadt Scott & Courtney, Davidson Victory, Antwerp, 60 bls. old waste bagging.

(———), Davidson Victory, Antwerp, 63 bls. bagging.

Chase National Bank, American Traveler, Manchester, 14 bls. wool rags.

(———), American Traveler, Glasgow, 46 bls. linen thread waste.

Irving Trust Co., Belle of the Sea, London, 68 bls. paperstock.

Riverside Mills, Vinkt, Antwerp, 175 bls. cotton waste.

State Street Trust Co., Macalester Victory, Venice, 58 bls. dark cotton rags, 55 bls. light cottons, 40 bls. old prints.

Continental Bank Trust Co., Macalester Victory, Venice, 56 bls. bagging, 57 bls. khaki cuttings.

American Cotton Products Co., Koloa Victory, Shanghai, 100 bls. cotton waste.

S. H. Waldstein, Koloa Victory, Shanghai, 200 bls. cotton waste.

C. Comiter, Koloa Victory, Shanghai, 300 bls. cotton waste.

M. E. Schoen, Koloa Victory, Shanghai, 200 bls. cotton waste.

Atlas Waste Manufacturing Co., Cape Race, Havana, 20 bls. cotton waste.

National City Bank, Mankato Victory, Leghorn, 219 bls. old dark cotton rags.

Harris Goldman, Mankato Victory, Leghorn, 332 bls. cotton rags.

A. W. Fenton Co., Mankato Victory, Leghorn, 189 bls. dark cotton rags.

(———), Willis Vickery, Bombay, 100 bls. old jute rags.

S. H. Waldstein, Willis Vickery, Bombay, 125 bls. cotton waste.

Lush Cotton Products Co., Willis Vickery, Bombay, 200 bls. cotton waste.

Brandwein Mazur Co., Willis Vickery, Bombay, 300 bls. cotton waste.

C. Comiter, Willis Vickery, Bombay, 145 bls. cotton waste.

New England Waste Co., Willis Vickery, Genoa, 124 bls. cotton waste.

Royal Manufacturing Co., Aalsdyk, Antwerp, 154 bls. cotton waste.

Chase National Bank, American Forwarder, Manchester, 14 bls. wool rags.

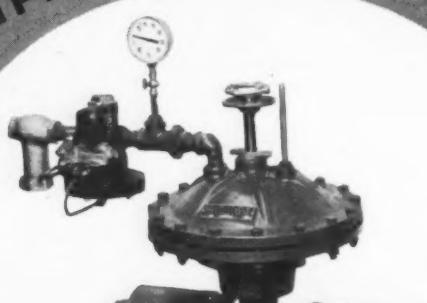
Atlas Waste Manufacturing Co., American Forwarder, Manchester, 3 bls. wool rags.

J. Eisenberg, American Forwarder, Manchester, 30 bls. wool rags.

J. Eisenberg, American Forwarder, Liverpool, 8 bls. thread waste.

Manufacturers Trust Co., Pacific Victory, Genoa, 235 bls. old waste bagging.

ODS
OLIVER DIAPHRAGM SLURRY



READY
to Do These Jobs in Your Mill—WELL

1 Handle coating materials

2 Handle sizing materials

3 Handle lime mud

This is the diaphragm slurry pump that is doing an excellent job in chemical plants. It has excellent efficiency. But more than that, it offers great economy because of its durability and low maintenance. The diaphragm, for instance, is activated solely by vacuum, pressure or a combination of both. There is no mechanical linkage. And there are no weakening center or circumferential holes punched in it. There are no motor, stuffing box, packing or high-speed moving parts. Flows can be "cycled" or proportioned. Several sizes of pumps from 1 to 3 inches are available.

Write for Bulletin 309. It gives full details.

SHIPMENT FROM EASTERN OR WESTERN FACTORY!

OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

San Francisco 11
California

Sales & Manufacturing Representative:
E. Long Limited
Orillia, Canada

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, Calif.
2900 Glascock Street

UF INC.

Factories: Oakland, Calif. • Hazleton, Pa. • Orillia, Canada • Melbourne, Australia

Amicale Wool Service Co., Pacific Victory, Genoa, 230 bls. old dark cotton rags.
Continental Bank Trust Co., Tucson Victory, Alexandria, 144 bls. old white cotton rags.
H. Adlerstein, Tucson Victory, Genoa, 102 bls. old jute rags.
(———), Tureby, Istanbul, 2360 bls. rags.
Irving Trust Co., Tureby, Alexandria, 79 bls. old light hessian bagging, 87 bls. old bagging.
National City Bank, Tureby, Alexandria, 101 bls. camouflage hessian bagging, 69 bls. old hessian bagging.
(———), Tureby, Alexandria, 105 bls. old waste bagging.
Continental Bank Trust Co., Tureby, Alexandria, 80 bls. bagging, 145 bls. old cotton rags.
Chase National Bank, Tureby, Alexandria, 68 bls. cotton rags.

OLD ROPE

National City Bank, Newbrough, Calcutta, 230 bls. old hemp rope cuttings.
(———), Newbrough, Calcutta, 155 bls. old hemp rope cuttings.
National City Bank, Rowanbank, Calcutta, 330 bls. old hemp rope cuttings.
(———), Rowanbank, Calcutta, 65 bls. old hemp rope cuttings.

CASEIN

American Cyanamid Co., Mormacpenn, Buenos Aires, 1500 bags.
Bank of London & South America, Defoe, Buenos Aires, 2000 bags (lactic).
American Cyanamid Co., Fort Columbia, Buenos Aires, 2000 bags (ground lactic), 600 bags (ground rennet).
Hercules Powder Co., Fort Columbia, Buenos Aires, 5000 bags (ground lactic).

GLUESTOCK, ETC.

H. Remiw, Mormacpenn, Rio de Janeiro, 308 bags gluestock.
Irving Trust Co., Newbrough, Calcutta, 624 bls. hide fleshings.
(———), Jean, Trujillo City, 98 pkgs. gluestock.
Transatlantic Animal By-Products Co., Jefferson City Victory, Antwerp, 200 bags bone glue.

WOODPULP BOARDS

Fibre Products Manufacturing Co., Drottningholm, Gothenburg, 58 bls.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 21, 1948

S. L. Ayres, Koloa Victory, Shanghai, 200 bls. cotton waste.
S. H. Waldstein, Koloa Victory, Shanghai, 100 bls. cotton waste.
Castle & Overton, Inc., Pacific Victory, Genoa, 232 bls. dark cotton rags.
H. Adlerstein, Tucson Victory, Genoa, 93 bls. dark cotton rags.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 21, 1948

Gilman Paper Co., Vretaholm, Gothenburg, 145 rolls newsprint.
Philadelphia Inquirer, Vretaholm, Gothenburg, 404 rolls newsprint.
Price & Pierce, Ltd., Vretaholm, Goth-

(Continued on page 154)

MARKETS

No such optimism as that which started the year 1947 in the papermaking chemicals field was evident at this year's beginning. Shortages of chlorine, soda ash, caustic soda and titanium dioxide, advanced to that stage where submission is no longer a choice, showed little sign of improved supply during the year ahead, even while discussion centered around amounts to be released for European recovery; while shortages of tankers and boxcars hindered movement of supplies, and heavy snows and zero weather contributed frozen and blocked transportation.

The year 1947 had been forecast as a return to normal business with government controls withdrawn, more raw materials available, and supply and demand nearing a balance. Transportation was to be improved, labor conditions looked hopeful, and the chemicals industry believed its wartime problems were done. It soon became apparent that worse was ahead. Shortages of tankcars which were evident at the first of the year continued without improvement. Added to the problem were shortages of drums, steel containers, carboys, boxcars and tankwagons. Costs of basic ingredients rose and freight rates jumped. Export trade was disturbed by dollar shortages. Black markets flourished on caustic soda. Speculation on Argentine casein turned the domestic market over. Mills which had turned to the use of bleaching powders to replace chlorine, ran into shortages of metal containers. Sodium bicarbonate used as a substitute for soda ash could not be shipped for lack of boxcars. Heavy chemicals were disturbed by strikes, cutback productions and spiralling costs.

Withal, some improvement was noted in supply. China clay and imported talc were freer, sulphur tonnages were the largest on record, cornstarch generally was abreast of demand, and sulphate of alumina moved from fair into good supply.

Outlook for 1948 is unsettled by continued short supply of chlorine, soda ash, caustic soda and titanium dioxide, with strong demand and no hope of immediate improvement in supply. Aggravated too has been frozen transportation and shortages of tankers and boxcars. And while the weather's effect on industry caused some shutdowns and temporary slackening of demand, improvement was scarcely noticeable. And while government regulation of export prices is seen as a deterrent to black marketing in caustic soda, the Department of Commerce's efforts to regulate the alkali industry suggests new headaches. Reports of price drops following commodity market break is expected, but no marked change in papermaking chemicals is probable.

Country quotas of alkalies for the first quarter of 1948 were announced this week by the Department of Commerce through its Office of International Trade. The country quotas and types of alkalies with their Census Schedule B numbers follow:

(in 100 pounds)	Caustic Soda 837300	Soda Ash 836500 837900
Newfoundland & Labrador	25	100
Mexico	18,150	17,000
Guatemala	500	350
El Salvador	350	150
Honduras	225	150
Nicaragua	275	300
Costa Rica	125	100
Panama	300	150
Cuba	4,950	4,000
Haiti	50	100
Dominican Republic	275	200
Barbados	75	...
Trinidad & Tobago	75	...
Curacao (N.W.I.)	550	100
French West Indies	25	...
Colombia	4,175	3,300
Venezuela	775	1,100
British Guiana	75	...
Surinam	50	50
Ecuador	250	200
Peru	2,150	3,500
Bolivia	75	350
Chile	1,100	900
Brazil	22,000	13,000
Paraguay	250	300
Uruguay	125	1,500
Argentina	22,000	30,000
Sweden	...	1,000
Norway	150	...
Denmark	3,025	3,000
Eire	...	1,000
Netherlands	4,825	3,000
Portugal	100	100
Finland	...	1,700
Greece	225	600
Turkey	2,000	2,000
Iran	...	100
Saudi Arabia	100	...
Lebanon	350	...
India & Dependencies	13,700	3,000
Burma	25	...
Thailand (Siam)	25	750
British Malaya	1,100	1,250
Netherlands Indies	3,300	100
Philippines	4,125	1,200
China	3,300	2,000
Hong Kong	2,750	800
Australia	4,925	11,000
New Zealand	775	1,000
French Oceania	50	...
Egypt	25	...
Belgian Congo	1,800	300
Mozambique	100	...
Union of South Africa	450	400
Southern Rhodesia	25	...
Total	126,225	111,200
Special projects	7,000	3,500
Undistributed reserve	10,775	5,300
Total authorized allocation	144,000	120,000

Blanc Fixe

Supplies which had started the year tight improved in mid-March, though shipment was delayed by lack of freight cars. This improvement continued to provide a steady supply until December, when demand tightened supply. Shipments throughout the year were, however, hampered by delivery conditions. Pulp price on January 1, 1947, was $70, and currently is quoted at $85 in bags, car lots at works, 6 cents per lb., l.c.l., deld.; by-product, January 1, 1947, was $60 per ton, currently is $72.50, car lots at works, 6c per lb., l.c.l., deld.

Bleaching Powder

Supply reported as adequate on January 1 continued in good condition, but demand increased as mills substituted bleaching powder for chlorine, making for tighter supply. Shortage of metal containers continues to delay shipments. Price currently ranges from $3.75 to $4 per 100-pound drums, l.c.l. works, having advanced from the January 1, 1947, range of $2.50 to $3.10.

Casein

Abnormally high prices of the year's beginning — 46c to 52c per pound for imported and domestic product — rose to 60c a year ago, and then dropped to more nearly normal levels when spring production came onto the market. Effect of the Argentine product was noticeable on the domestic market price, particularly in the mid-Fall when speculation caused considerable disturbance. Prices leveled to approximately current levels in December when domestic production was almost at a standstill. Current quotations on processed acid precipitated casein are 33 to 35 cents per pound for domestic grades, and 29 to 30 cents for imported grades, f.o.b. shipping point. Production for 1947 fell 9 million pounds under estimates and stocks were inadequate to demand. Uncertainty of 1948 production and demands of ERP lend no optimism for improved supply.

Caustic Soda

No improvement whatever on supply can be chalked up for 1947 for caustic soda. The situation remains precisely as tight with no improvement expected despite new production scheduled for this year, as industry creates new demands and ERP and export trade require additional quantities. Present dollar shortage is currently hampering export trade. During the year considerable quantities were received from overseas, principally from France, most of which were used for export resale. Government steps to relieve this tension may serve to clarify supply and demand situation. Prices on solid caustic jumped from $2.30 on January 1, 1947, to $2.50 - $2.85. Currently solid caustic is reported at $2.85 per cwt.; flaked and ground at $3.25 per cwt. in 400 pound drums, $3.75 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.25 per cwt.; liquid 73 percent in tank cars at $2.35 per cwt. at works.

China Clay

Supplies which had started the year tight eased to good during the summer, a condition which continues on both domestic and imported grades. Outlook for 1948 is considered good. Filled is currently quoted at $9 to $11.50 per ton, car lots, coating at $14 to $22. Imported clay, short tons, is $16 to $35, export warehouse.

RAYCO
LINTER COTTON
Fits into your production picture

Eliminates rag room operations

Delivered clean, carefully graded—ready for the cooker

Easily adaptable to a variety of processes and types of equipment

Cuts cooking time

Ideal base material for high quality cotton content paper

For an in-the-mill demonstration phone, wire or write the Sales Office nearest you.

The RAILWAY SUPPLY & MFG. CO. and Affiliates

Specialists in Grading, Marketing and Processing Cotton Fibers

General Offices: CINCINNATI, OHIO

New York • Chicago • Memphis • Dallas
Detroit • Atlanta • Charlotte

RAYCO
LINTER COTTON

Chlorine

What was said in January 1947 about this chemical may be repeated today and again when the year closes. Market is tight with demand exceeding output. Stocks are low and shortage of tankcars hampers deliveries. Occasional relief brought slight easement, particularly since the first of 1946 when demand slackened and industries were slowed by fuel shortages. Supply does not improve, and demand is strong. With the aid of substitutes such as bleaching powder, ferric chloride, et cetera, chlorine demand has been eased somewhat, but it is still far ahead of supply. Prices were sustained throughout the year without advance, and are currently quoted at $2.25 per cwt. in single unit tank cars, $2.55 to $3.75 per cwt. multi-unit tank cars, f.o.b. works.

Rosin

Generally supplies of rosin were adequate to demand throughout the year with good prospects for domestic and export requirements for 1948. Prices opened the year 1947 strong and continued to rise throughout the spring, retrograded in June to meet the first of the year prices, then started to rise again November 1 to present day levels. As a result of the commodity break, rosin prices started backward last week—this despite the tight supply situation and a comparatively inactive non-production season. Prices are reported as follows: gum rosin in drums per 100 pounds net in yard, N.Y. car lots, B, $9.55; D, $9.80; E, $10.05; F, G, H, $10.30; K, M, N, $10.50; WG, $10.70; WW, $10.80; wood rosin, per 100 pounds, net, f.o.b., l.c.l., N.Y., B, $6.45; FF, $7.95; G, H, I, K, $10.20; M, $10.25; N, $10.64; WG, $10.95; WW, $11.08; X, $11.18.

Salt Cake

Salt cake too is in strong demand with shorter supply. No visible improvement in the situation was noticeable during the year 1947 nor is foreseen for the year ahead. Prices advanced from $15 per ton to $20 during the year, and domestic grade is currently quoted at $20 to $26 per ton.

Soda Ash

Prices advanced but slightly during the year. Quoted at $.95 per 100 pounds in bulk, advancing to $1 and closing at $1.10. Current prices are, car lots, per 100 pounds, as follows: in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.80. This with caustic soda make up the chief headaches of the industry; and although it is reported the condition improved a little during the year, the result is infinitesimal. Export quotas set at 60,000 tons for the first quarter will bring no easement since the balance of 2650 tons is to be kept as undistributed reserve. Demand has increased from some industries where it has lessened from others. New capacity should add to supply late this year but will be insufficient to bring it into balance. Look for continued shortages.

Sodium Bicarbonate

Pressure on soda ash has been relieved to a degree by the use of sodium bicarbonate, which registers the result of increased demand. Supply continues to be about on par with demand, though boxcar shortages have hampered shipping. Price is steady at $1.85 per 100 lbs., paper bags, carload lots.

Starch

Production throughout the year continued for the most adequate to domestic and export demand. Prices varied with the corn market from $3.62 for pearl grade at the year's beginning to $7.02 at its close, rising again to $7.31 and declining to present figures of $6.66 per 100 pounds; powdered began at $3.73, rose to $7.13, to $7.42, and is quoted today at $6.77 per 100 pounds, car lots, New York.

Sulphate of Alumina

Supply improved during the year from fair to adequate. Now reported as steady, indications are for continuation. Commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2 per 100 pounds in bags, car lots, at works.

Sulphur

Ample supply was reported throughout the year with prospect of good stocks. And while changes have been reported, the range of $16 to $18 per long ton, f.o.b. mines is current; at Gulf ports, f.o.b., is $17.50 to $19.50 per long ton.

Talc

Increased demand moved talc from fair volume of supply to an unbalanced condition, and demand is reported still far in excess of supply with promise of betterment. Domestic grades are currently quoted at $21 per ton in mines; Canadian at $35 and up per ton, all prices in car lots.

Titanium Dioxide

With supply in worsened plight as a result of civil problems in India and uncertainty of increased production domestically, the Army announces its plans for using titanium ore for high-speed plane construction, and will devote research to developing new sources of supply. One of the country's chief suppliers also makes known a new process for increasing production of ilmenite ore, the raw material for titanium. What these can do for this year's supply is unknown. Present conditions are an extremely tight supply with no easement in sight. Prices advanced during the year 2c per lb., and currently are quoted as follows: Anatase 17½c per lb., carload lots, 18-18½c l.c.l.; rutile, 19½c lb. carload lots, 20-20½c l.c.l.; 50-lb. bags, f.o.b. plant, minimum freight allowance.

TRENDS

Whether the waste paper industry reached its optimum of importance and profit during 1947, the future must decide. That it was one of the best years for collections and prices is conceded in the trade without dissension, as the salvage business which had strode into vast development to meet the nation's war time requirements became increasingly essential to the paper and paperboard industries as a source of pulp supply.

Optimism expressed at the year's beginning for the paper and board industries was crystallized in the record output of 21,028,898 tons of paper and board products to meet the record demand which closed the year with huge backlogs of orders for most varieties of paper and a somewhat shorter log and its products. Paperboard and products alone registered an increase in production approximating 9.53 percent, with a consequent increased demand for waste paper.

Collections during typical years have returned as waste approximately 30 percent of the tonnage produced as new paper. Wartime campaigns swelled this percentage to about 35, though it sagged to 32 in 1946, a percentage which does not appear likely of maintenance as the nation's citizenry slackens into peacetime habits. Nevertheless the industry collected 7,863,369 tons of waste paper for the year 1947, an increase of over 6 percent from 1946, for consumption of 7,836,947 tons or an increase of approximately 8 percent.

Continuous shortages of virgin pulp kept high grade replacements in constant short supply, and consumer buyers were willing to grant premiums to procure chemical pulp substitutes. Quotably prices on these grades varied little during the year, but supplies were so meagre that prices were paid well above the ruling level.

Demand for low bulky grades eased somewhat during the vacation months but came back with heightened punch in September so that concerted effort was required on collections to produce sufficient tonnage to fill requirements. Favored by good weather for many weeks, bumper crops rolled in beyond mill absorptive possibilities; and a shrinkage in value resulted.

Commenting on prices in the paper and paperboard industry, the United States Department of Commerce reports that "The price index of paperboard reflects directly the greatly increased costs of waste paper, the chief source of raw materials for many grades of board. The waste paper price index on the other hand reflects primarily the extraordinary efforts necessary to obtain supplies. Experience proved that providing waste paper prices increase to sufficiently attractive levels, supplies from areas and sources not normally tapped would be placed on the market."

During the first quarter, low bulky grade prices became firm, a price position which is considered unexpected. Late in March when the early spring's favorable collection weather usually is looked to for lowering prices, No. 1 mixed advanced to $22-23 on cars, folded news to $32-33, and old corrugated to $33-34, with board mills eager to absorb tonnages and offering a dollar or two in advance of these prices. Demand continued so strong throughout April that prices even advanced a little nor showed signs of easing until May. By June a steady decline was noted, so that the year's end showed the dealer prices listed in the box.

	No. 1 Hard White Shavings	Heavy Books & Magazines	No. 1 Mixed Paper	Folded (No. 1) News
January 1, 1947	$100.00	$38.50	$19.00	$25.00
Year's High	125.00	47.00	21.00	30.00
Year's Low	100.00	22.00	9.00	12.00
Average	108.79	38.80	15.28	19.67
January 1, 1948	110.00	nom.	10.00	13.00

At the year's close, prices for high grades were still so varied that it became hard to quote them accurately, and this journal's columns carried notation that quotations would be "base price to mill" without a top limit, a condition which is still existent on these grades.

With the strong demand came insistence on better pack. Days had gone when there was inclination to put up with conditions that could not be bettered. Consumers were known to return inferior stock, to demand better packing and grading, also to offer better prices for true quality. Complaints of poor baling, poor sorting and poor export pack came aplenty. Added to these was the shortage of steel bale ties which has not been alleviated, for with the increased tonnage of waste has come increased need for ties. It is estimated the eleven months of 1947 consumed more than all of 1946.

As good a year for 1948 is foreseen with a steady even pace of sound business developing. High grades must continue in strong demand with firm prices so long as wood pulp remains a world shortage. The severity of the winter which resulted in frozen collections and kept prices at peak seems to have improved so that a reaction may be expected with spring floodtides. But with continued heavy demand of the industry to meet per capita paper and paperboard consumption, a good year in domestic demand is predicted with possibilities of some export trade when dollars are made available through the Marshall plan.

Reflecting the increased production of the paper industry as a whole, board mills consumed record amounts of rag stock, although buying on a large scale was confined to early spring and autumn when collections are fullest and prices steady.

During the first quarter when collections are limited and grading operations curtailed, prices were firm. Following this period, collections and graders provided abundant old rags so that mill buying for current production and inventories was strong until the summer leveling period. Active buying which resumes about Labor Day brought No. 2 roofing rags to $35 and then to $40, though at the year's end they again had fallen to $35. Repacked whites started the year at $4.125, rose to $4.25, dropped to $3.75, and closed at $4.125. Graders complained that prices they were obliged to pay for mixed were too high and the return too low to return a fair profit. Reports are that there is heightened interest in foreign rags which are again beginning to flow in some quantity.

New cotton cuttings advanced steadily all year as limited supplies from garment houses failed to keep abreast the demand of paper and fibre mills. The result was a continual absence of material throughout much of the year; and price levels were maintained through restricted buying. White shirt cuttings opened the year at $10.25, advanced to $11, maintained strength throughout the summer's quiet market, and closed the year at $11.75, dealer's prices.

Heavy call from fine paper manufacturers contributed to the record demand, while plastic manufacturers also drew on the supplies of high grade new cuttings and were willing to pay somewhat more for them. Thus while

	No. 1 Whites Repacked	Thirds & Blues Repacked	No. 1 White Shirt Cuttings
January 1, 1947	$4.125	$2.875	$10.25
Year's High	4.50	3.00	12.00
Year's Low	3.50	2.25	10.00
Average	4.097	2.651	10.91
Closed	4.125	2.625	11.56

papermakers tried to hold the delivered price, plastic manufacturers competed for supplies at higher prices. As a result of the unbalance of supply and demand, consumer demand for quality pack was not too successful.

The year closed with a lull in trading, firm prices, low receipts, and mill inventories reduced to two months' supply, with buying proceeding on a cautious scale for current needs only. Outlook for new cottons is somewhat uncertain with the fine paper field operating on curtailed production of high content rag, supplies from garment manufacturers coming in limited flow, the government projecting plans to subsidize the use of virgin cotton in paper manufacture, and the commodity market badly shaken. Export markets for rags carry a dim outlook because of dollar shortages. It is believed that these markets must be maintained until signs of recovery are evident, also that definite steps must be taken by United States dealers to build confidence in U. S. packings by fuller knowledge of European specifications and compliance with requirements of true grading and good packing.

Summary of the year's prices is shown in the tables.

WHY RISK WORK STOPPAGES DUE TO Pump Failure?

CONTINUITY of paper production was never more important than NOW. Nothing slides down hill faster than a production record when faulty or inefficient pumps refuse to carry their load. Profits disappear... orders pile up... and labor costs mount.

Replace time-worn or obsolescent pumps with modern, performance tested Warren Pumps . . . the pump that STANDS UP LONGER with LESS MAINTENANCE, even on your toughest jobs.

Why not take some action on this problem today? Discuss your situation with a Warren Pump specialist. His suggestions will help you maintain constant, profitable production.

Write, wire or phone:

WARREN STEAM PUMP COMPANY, INC.
Warren, Massachusetts

PP71½

WARREN PUMPS

Warren Double Suction Pump Single Stage
Warren Machine and Jordan Chest Pump
Warren Liquor Pump, Type "L" Single-stage, Single-suction
Warren Stock Pump Type 2-SOD-11 and 3-SOD-11
Warren Stock Pump Type 5-SOD-15 . . . 12" suction nozzle

Imports

(Continued from page 150)

enburg, 1000 bls. strong sulphite, pulp, 5182 bls. bleached sulphate pulp, 1402 bls. unbleached sulphate pulp.

The Borregaard Co., Inc., Vretaholm, Gothenburg, 1164 rolls wrapping paper.

Central Penn National Bank, Vretaholm, Gothenburg, 146 rolls wrapping paper.

Castle & Overton, Inc., Vretaholm, Gothenburg, 2433 bls. dry sulphite pulp.

Paper Corp. of America, Vretaholm, Gothenburg, 820 bls. dry sulphite pulp.

Leigh Textile Co., American Forwarder, Manchester, 139 bls. mixed bagging.

Castle & Overton, Inc., American Traveler, Liverpool, 71 bls. cotton cuttings.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 21, 1948

Continental Bank Trust Co., Macalester Victory, Venice, 88 bls. bagging.

Pagel Horton & Co., Inc., Vretaholm, Brevik, 965 rolls newsprint.

Pittsburgh Press, Vretaholm, Gothenburg, 339 rolls newsprint.

Wachowla Bank Trust Co., Vretaholm, Gothenburg, 129 rolls newsprint.

Stora Kopparberg Corp., Vretaholm, Gothenburg, 757 rolls newsprint.

Group Would Expand Forest Service Funds

APPLETON, Wis. — Representative Glenn R. Davis, Wisconsin Republican, is one of the leaders of a bi-partisan group of 24 congressmen who organized last week in an attempt to add $1,824,600 to appropriations recommended for the United States Forest Service. The group was to lay its case before the house appropriations committee this week.

Among the aims of the group are doubling of the $124,600, recommended for the service's tree-planting program; and $2,500,000, instead of $1,500,000, for experimental forests and ranges, and $1,500,000, instead of $800,000, for cooperative work with farmers and other private forest owners.

Charles H. Forster

VANCOUVER, B. C.—Charles H. Forster, sales manager for Canadian Boxes Ltd., subsidiary of Pacific Mills Limited, died at his home in Vancouver, B. C. recently after a short illness. Mr. Forster had been with Canadian Boxes Ltd. since it started in 1926. He came to Vancouver in 1923 from Edmonton, where he was manager of Edmonton Knitting Mills. He left work a week prior to his death because of a bronchial ailment. He leaves his wife in Vancouver and a sister in London, England.

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Rolls, contract ... $91.00 to $96.00
Sheets ... 102.50 " 109.00

Kraft—per cwt.—Carload Quantities
Zone A Deld. 40 lb. base wgt.
Superstandard Wrapping ... $9.00 to —
No. 1 Wrapping .. 7.25 " 8.00
Standard Wrapping 6.50 " —
Standard Bag ... 6.50 " —

Tissues—Per Ream 24x36 (480) 11 lb. Zone 1.
Wh. No. 1 Frd. .. $1.84 to $2.00
Wh. No. 1 M. G. 1.94 " 2.00
Wh. No. 1½ ... 1.60 " —
Wh. No. 2 ... 1.75 " —
Kraft Anti-Tar .. 1.65 " —
Kraft Unbl. ... 1.85 " —
Manila No. 2 ... 1.62 " —
Shred. Wh. No. 1 cwt. ... 1.10 " 1.50

Toilet—Per Case of 100 rolls—1 M Sheets.
Unbleached ... $8.50 to $10.00
Bleached ... 8.50 " 10.00

Paper Towels—Per Case of 3750—Zone 1,
Wh. Jr. M'tif'd 9¼x9½ ... $5.15
Br. Sr. M'tif'd 10x12 ... 3.60
Br. Jr. M'tif'd 9½x9¼ ... 3.10
Br. Jr. Sgl. fold 10 x10¾ .. 3.15

Manila—per cwt.—C-l. f.a.
No. 1 Jute Tag .. $14.50 to —
Reg. Jute Manila 13.25 " $15.50
No. 1 Manila ... 9.75 " —

Boards, per ton—
Plain News ... $92.50 " —
Filled News ... 94.00 " —
Plain Chip ... 90.00 " —
Sgl. Mla. J-d. Chip* ... 100.00 " 102.50
White Pat. Coated* 120.00 " —
Kraft Liners 42 lb. 100.00 " —
Kraft Corr. .009 105.00 " —
Binders Boards .. 126.00 " —

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; regular 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1: Rag Content Bonds and Ledgers—

White, Assorted Items
Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Ledgers, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Sulphite Bonds and Ledgers—
White, Assorted Items
Bonds, per cwt.

No. 1	$21.25	$19.25	$18.50
No. 2	20.25	18.30	17.55
No. 4	19.25	17.55	16.85

Ledgers, per cwt.

No. 1	$21.75	$19.65	$18.85
No. 2	20.75	18.75	18.05
No. 4	20.00	18.10	17.35

Free Sheet Book Papers—
White, Cased Paper
(Per cwt.)

	Case	Ton
No. 1 Glossy Coated ...	$20.40	$18.50
No. 2 Glossy Coated	19.15	18.30
No. 3 Glossy Coated	18.40	17.60

(Per cwt.)

	Case	Ton
No. 1 Antique (Watermarked) ...	$15.90	$15.15
No. 2 Offset ...	15.15	14.60
	to	to
A Grade E. F. ...	17.90	17.10
A Grade S. & S. C. ..	14.90	14.25
B Grade E. F. ...	15.40	14.65
B Grade S. C. ...	13.90	13.30
	14.40	13.70

Wood Pulp

Domestic mill contract prices delivered with varying freight allowances.

	Per Short ADT
Groundwood ...	$80.00 to $81.00
Unbleached Sulphite ..	124.00 " —
Bleached Sulphite ...	125.00 " 135.00
Bleached Soda ...	130.00 " —
Bleached Sulphate ...	175.00 " 185.00
Unbleached Sulphate Northern ...	125.00 " 155.00
Unbleached Sulphate Southern ...	130.00 " 145.00

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified

	Per Short ADT
Reg. No. 1 Kraft	125.00 " —
Unbleached Sulphite.	125.00 " 126.00
Bleached Sulphite ...	125.00 " 135.00
Glassine Unbleached Sulphite (no freight allowance) ...	120.00 " —
Bleached Soda ...	130.00 " —
Groundwood ...	80.00 " 85.00
Sideruns Pulping News	80.00 " —
Hardwood and Specialty Grades	Nominal

Swedish Quotations
On dock, Atlantic Ports

	Per Short ADT
Bleached Kraft	175.00 " 185.00
Bleached Sulphite ..	175.00 " 185.00
Unbleached Sulphite..	145.00 " 175.00
Unbleached Kraft....	140.00 " 165.00

Finnish Quotations
On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite ..	$185.00 to —
Unbleached Sulphite	155.00 " 157.00
Unbleached Sulphate	147.50 " —

New Domestic Cotton Cuttings

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
White Shirt ...	$12.00 to $12.50
Unbleached Muslin ...	12.00 " 12.50
Light Silesias ...	9.00 " 9.25
White Back Blue Overalls ...	9.00 " 9.50
Blue Overalls ...	8.00 " 8.25
Fancy Shirt ...	6.00 " 6.25
Light Percales ...	8.50 " 8.75
Light Prints ...	7.50 " 7.75
No. 1 Washables	5.00 " 5.25
Bleachable Khaki	7.50 " 8.00
Unbleachable Khaki ..	6.50 " 7.00
Cottonades ...	5.50 " 5.75

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.50 to $6.00
No. 1 Whites Miscellaneous ...	4.50 " 5.00
No. 2 Whites Repacked	3.50 " 3.75
No. 2 Whites Miscellaneous ...	3.00 " 3.50
Blue Overalls ...	3.75 " 4.00
Thirds and Blues Repacked ...	3.25 " 3.50
No. 1 Roofing Rags ..	2.10 " 2.15
No. 2 Roofing Rags ..	1.90 " 2.00
No. 3 Jute Bagging ..	1.75 " 1.85
No. 4 Brussels and hard back carpets ..	1.75 " 1.85
No. 5A Roofing Rags .	1.75 " 1.85

New Foreign Cotton Cuttings

(Prices to Mill, F.O.B. Dock, N. Y.)

	Per 100 lbs.
New Dark Cuttings ..	$5.50 to $5.75
New Mixed Cuttings .	6.25 " 6.50
Light Silesias ...	9.25 " 9.50
Light Flannelettes ..	9.25 " 9.50
New White Cuttings .	12.00 " 13.00
New Unbleached Cuttings ...	12.25 " 13.00
Fancy Shirt Cuttings.	6.50 " 7.00
Light Prints ...	7.75 " 8.00
Bleachable Khaki, No. 1	7.00 " 7.50
Unbl. Khaki, No. 1 ..	6.25 " 6.75

Old Foreign Rags

(Prices to Mill, f.o.b. dock, N.Y.)

	Per 100 lbs.
No. 1 White Linens..	$14.00 to 16.00
No. 2 White Linens...	12.00 " 13.00
No. 3 White Linens...	8.00 " 9.00
No. 4 White Linens...	8.00 " 9.00
No. 1 White Cottons..	8.00 " 10.00
No. 2 White Cottons..	7.00 " 8.00
No. 3 White Cottons..	6.00 " 6.50
No. 4 White Cottons..	4.00 " 4.50
Extra Light Prints....	6.50 " 7.00
Old Light Prints	4.50 " 5.00
Med. Light Prints	4.00 " 4.50
Dutch Blue Cottons..	5.25 " 5.50
Checks and Blues.....	4.00 " 4.25
Linsey Garments	2.60 " 2.75
Dark Cottons, European	2.50 " 2.60
Dark Cottons, Egyptian	3.00 " 3.25
Old Shopperies	2.20 " 2.30
New Shopperies	2.40 " 2.50

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs
Foreign Gunny, No.1..	$6.00 to $6.50
Domestic Gunny, No. 1	6.25 " 6.50
Light Wool Tares	6.25 " 6.50
Heavy Wool Tares	6.00 " 6.25
No. 1 Scrap Bagging ..	5.50 " 5.75
Roofing Bagging	2.00 " 2.25
Foreign Manila Rope ..	6.00 " 6.75
Domestic Manila Rope.	6.50 " 6.75
Jute Strings	5.00 " 5.25
No. 1 Sisal Strings ...	5.25 " 5.50
Mixed Strings	1.75 " 2.50

Waste Paper

Base Prices to Mills for Average Packings

(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut ...	155.00 to 165.00
No. 1 Hard White Envelope Cuts	145.00 " 155.00
No. 1 Hard White Shavings, unruled.	145.00 " 155.00
No. 1 Hard White Shavings, ruled ..	110.00 " 130.00
Soft White Shavings, one cut ...	145.00 " 155.00
No. 1 Soft White Shavings ...	135.00 " 145.00
Soft White Shavings, Misc. ...	125.00 " 135.00
No. 1 Fly Leaf Shavings ...	45.00 " —
No. 1 Groundwood Fly Leaf Shaving	35.00 " —
No. 1 Heavy Books & Magazines ...	27.00 " —
Mixed Books ...	15.00 " 20.00
No. 1 White Ledger	85.00 " 90.00
Manila Tab. Cards ..	9.50 " 11.00
New Manila Envelope Cuttings, one cut..	100.00 " 110.00
New Manila Envelope Cuttings ...	65.00 " 75.00
Extra Manilas ...	25.00 " 30.00
Mixed Kraft, Env. & Bag Cuttings ...	75.00 " 85.00
Kraft Envelope Cuttings ...	110.00 " —
Triple Sorted, No. 1 Brown Soft Kraft.	65.00 " 75.00
New Kraft Corrugated Cuttings	80.00 " 85.00
No. 1 Assorted Old Kraft ...	55.00 " 60.00
New Jute Corrugated Cuttings ...	27.00 " —
Old 100% Kraft Corrugated Containers	45.00 " 50.00
No. 1 News ...	20.00 " 21.00
No. 1 Mixed Paper ..	11.00 " 13.00
Box Board Cuttings..	— " —
White Blank News...	75.00 " 85.00
Overissue News	23.00 " 24.00
Old Corrugated	26.00 " 28.00
Mill Wrappers	22.00 " 24.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished—	
India ...	.33¾ to .35
Fine India ...	.38¾ " .42½
Fine Polished—	
Unpolished—	
Paper Makers	.28¾ " .30¾
Tube Rope ...	.29 " .31½
Wrapping ...	.32 " .35¾
Cotton ...	.63¼ " .66¾

(Hard Fiber)

Mex. Sisal ...	.21 " .27
Manila (Reprocessed)	.30 " .32

(American Hemp)

Polished Hemp ...	.36¾ " .60
Unpolished ...	.32¾ " .54

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—	
New White No. 1..	.11 to .12
New White No. 2..	nominal
Light Silesias ...	.07½ " .08
Black Silesias, soft	.06½ " .07
New Unbleached ..	.10½ " .11¼
Washable Prints ..	.06½ " .07
Washable No. 1....	.05 " .05½
Blue Overall	.07½ " .08
Cottons—According to grades—	
Washable Shredding	.03½ " .04
Fancy Percales	.06¼ " .07¼
New Black Soft ...	nominal
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.06 " .06½
Bleachable Cotton Cuttings	.07 " .07½
Men's Corduroy ..	.05½ " .06
Ladies' Corduroy ..	.05 " .05½
Cottonades	.05¼ " .06
Mixed White	4.00 " 4.25
White No. 2—Repacked	3.50 " 3.75
Thirds and Blues—	
Miscellaneous	2.25 " 2.50
Repacked	2.75 " 3.00
Roofing Stock—	
Foreign No. 1.....	nominal
Domestic No. 1....	1.85 " 1.90
Domestic No. 2....	1.75 " 1.80
Roofing Bagging ..	1.65 " 1.70
Old Manilla Rope....	6.25 " 6.50

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

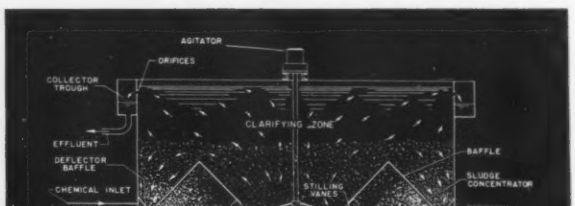
White No. 1—Repacked	4.50 to 5.00

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—	
Foreign	nominal
Domestic	4.75 to 5.25
No. 1 Clean Bright—	
Sisal Strings	.04½ " .05
No. 2 Clean Bright—	
Sisal Strings	.03½ " .04
Sisal Jute	.02¾ " .03
Scrap—	
No. 1	5.00 " 5.50
No. 2	2.50 " 3.00

LIQUON



The LIQUON Sludge Contact Reactor . . . the most modern design of coagulator . . . acts as a super-filter to entrap the fibre in the water. By using alum as the coagulant, the effluent is made so clear that the water can be re-used without subsequent filtration through sand. The distinctive design of this LIQUON unit also concentrates the fibre and discharges it automatically.

A LIQUON Sludge Contact Reactor often makes unnecessary the sinking of new wells when the existing supply becomes inadequate to take care of plant expansion.

This is only one of the helpful services offered by the LIQUON engineers to paper and pulp mills. Consult the long-experienced LIQUON specialists for the most modern and economical water clarification or softening processes, equipment and materials. Your request for advice and recommendations will not involve the slightest obligation.

LIQUID CONDITIONING CORPORATION

114 EAST PRICE STREET **LINDEN, N. J.**

Engineering Service Representatives in Principal Cities

Send this Coupon

Liquid Conditioning Corp., 114 East Price St., Linden, N. J.
Please send me information on water treatment for paper and pulp mills, without obligation to me.

NAME .....

POSITION .....

COMPANY .....

ADDRESS .....

PTJ—1-48

Wool Tares, heavy	4.75	"	5.00
New Burlap Cuttings	6.00	"	6.50

Old Papers
(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	to	$115.00
No. 1 Hard White Shavings, unruled	100.00	"	—
Soft White Shavings, one cut	90.00	"	95.00
White Blank News	70.00	"	75.00
Soft White Shavings	80.00	"	—
No. 1 White Ledger	85.00	"	90.00
Ledger, Colored	70.00	"	72.00
No. 1 Heavy Books & Magazines	24.00	"	26.00
Overissue Magazines	nominal		
New Manila Envelope Cuttings	80.00	"	—
No. 1 Assorted Old Kraft	60.00	"	65.00
No. 1 Mixed Paper	11.00	"	12.00
Box Board Cuttings	10.00	"	11.00
Kraft Corrugated Cuttings	90.00	"	100.00
Old Corrugated	24.00	"	26.00
Overissue News	20.00	"	22.00
No. 1 News	13.00	"	15.00

BOSTON

Old Papers
(F.o.b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled	6.25	to	6.75
No. 1 Hard White Shavings, ruled	6.00	"	6.50
Soft White Shavings, Misc.	5.25	"	5.50
No. 1 Fly Leaf Shavings	1.75	"	1.85
No. 2 Fly Leaf Shavings	1.65	"	1.75
No. 1 Groundwood Fly Leaf Shavings	1.75	"	2.00
No. 2 Groundwood Fly Leaf Shavings	1.50	"	1.75
Mixed Colored Shavings	2.00	"	2.25
New Manila Envelope Cuts, one cut	4.50	"	4.75
Hard White Envelope Cuts, one cut	6.00	"	6.50
Triple Sorted No. 1 Brown Soft Kraft	3.75	"	4.00
Mixed Kraft Env. & Bag Cuttings	4.00	"	4.25
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	1.25	"	1.75
New Manila Envelope Cuttings, one cut	—	"	—
New Manila Envelope Cuttings	4.00	"	4.25
White and Colored Tabulating Cards	4.00	"	4.50
Groundwood Tabulating Cards	1.50	"	1.75
White Blank News	2.25	"	2.50
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper	.65	"	.75
Overissue News	1.00	"	1.25
Box Board Cuttings	.60	"	.70
New Corrugated Cuttings, Kraft	2.75	"	3.00
Old Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.25	"	1.30
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.00	"	2.25

Bagging
(F. o. b. Boston)

Gunny Bagging—			
Foreign	—	to	4.75
Domestic	—	"	4.75
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.08	to	—
Fancy Percales	.07½	"	.08
New White No. 1	.11	"	.11½
New Light Flannelettes	.08	"	.08½
Canton Flannels, Bleached	.10	"	.11
Underwear Cutters, Bleached	.10	"	.11
Underwear Cutters, Unbleached	.11	"	.12
Silesias No. 1	.08	"	.08½
New Black Silesias	.05	"	—
Red Cotton Cuttings	.05	"	—
Blue Overalls	.08½	"	.09
Soft Unbleached	.11	"	.12
Blue Cheviots	.08½	"	.09
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	—	"	4.75
Domestic	—	"	4.87½
South America	5.25	"	—
Wool Tares—			
Foreign	4.75	"	—
Domestic	4.75	"	—
Asst. Wool Pouches	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—
Fancy	2.00	"	—
Washable	06	"	—
Khaki Cuttings	.06¼	"	.07¼
Corduroy	.03½	"	—
Khaki Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.10½	"	.11¼

Domestic Rags (Old)
(F. o. b. Boston)

White No. 1—			
Repacked	3.80	to	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues,			
Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	—
No. 2	1.75	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags
(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper
(F. o. b. Chicago)
Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$150.00	to	—
No. 1 Hard White Shavings, unruled	140.00	"	—
No. 1 Soft White Shavings	120.00	"	—
No. 1 White Ledger	95.00	to	—
No. 1 Heavy Books & Magazines	30.00	"	35.00
White Blank News	80.00	"	85.00
Mixed Kraft Env. & Bag Cuttings	80.00	"	90.00
No. 1 Assorted Old Kraft	35.00	"	—
Overissue News	27.00	"	—
No. 1 News	23.00	"	—
No. 1 Mixed Paper	15.00	"	—
Old Corrugated	25.00	"	—
Mill Wrappers	16.00	"	—

Connecticut Valley Alerted to Floods

SPRINGFIELD, Mass. —Paper manufacturers throughout the Connecticut Valley—mindful of floods which swept through the area in 1936, causing millions of dollars of property damage—are keeping a close eye on conditions along the entire stretch of the Connecticut River. The Hartford office of the United States Weather Bureau, in its first bulletin of the season on the subject of the Connecticut River, has discounted possibilities of heavy floods—unless there is an unusual spell of warm rain accompanying a sudden thaw.

Floods due to melting snow alone are rare and usually occur over limited areas, the bulletin said, adding that there is every indication that melting this season will be in progressive manner from South to North, with the heavy accumulation in Southern portions being depleted before appreciable melting farther North.

Another factor favoring predictions of no major flooding is that lack of deep frost in the ground will slow down the runoff and make it more uniform.

One unfavorable situation likely to cause flooding in localized areas is the threat of ice jams. The cold winter and low river stages allowed an abundance of ice to form which will probably build into serious jams, the bulletin warned.

There is little danger of serious flooding in the smaller streams leading into the Connecticut, in the opinion of the forecasters. The only exception would be the prolonged period of thawing coupled with heavy warm rains.

But even though weather bureau officials are hopeful, municipal officials in the area are taking no chances. The Springfield Board of Public Works has announced that U. S. Army Engineers will send a representative to Springfield shortly for a conference on the possibility of a spring flood on the Connecticut, and what the city may do to anticipate such a disaster.

The Board of Public Works requested the conference following a plea by Councilman Armand Tancrati and former State Representative John J. Riordan that consideration be given to blasting ice from the river to expedite the runoff of freshet water. Engineers from local paper industries are expected to attend the conference, to give their views on the proposal to dynamite the ice in northern sections to speed the runoff and prevent flood stages.

Hiring Problems Analyzed For Michigan Superintendents

KALAMAZOO—Practical psychological applications in hiring men for work in paper mills were outlined by Dr. William Thompson, Chicago, at the dinner meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association at the Park-American hotel last week. Dr. Thompson is consulting psychologist for Stevenson, Jordan and Harrison, management engineers. He was introduced by William H. Hathaway, second vice-chairman. He stressed selection of the right man for the work at the employment office and the proper placement in the plant as chief factors in maintaining an efficient and contented working force. William Astle, chairman, closing the meeting, announced the next gathering of the division will be an all-day coating session March 18. There were 60 mill men present.

Dresser Industries Resumes Dividends

NEW YORK — Resumption of dividends on common stock of Dresser Industries, Inc., was voted this week with a declaration by directors, at a meeting in New York, of a payment of 37½ cents a share, payable April 1 to shareholders of record at the close of business March 15.

The directors also voted payment of the regular quarterly dividend of 93¾ cents a share on the outstanding shares of Dresser's 3¾ percent preferred stock, payable March 15 to shareholders of record at the close of business March 1.

STOP!

LOOK NO FURTHER...

The answer to your question of what pumps to use in your pulp and paper mill is here, in Ingersoll-Rand's bulletin No. 7022. It covers both horizontal and vertical pumps for *all* your needs. Capacities range from 5 to 75,000 GPM and heads to 3100 ft.

Send for it today or call an I-R pump engineer—both can help you!

Ingersoll-Rand Company, Cameron Pump Division, 11 Broadway, New York 4, N. Y.

Ingersoll-Rand

106-10 ♥ 11 BROADWAY, NEW YORK 4, N. Y.

AIR TOOLS ROCK DRILLS
COMPRESSORS • TURBO BLOWERS
CENTRIFUGAL PUMPS • CONDENSERS
OIL AND GAS ENGINES

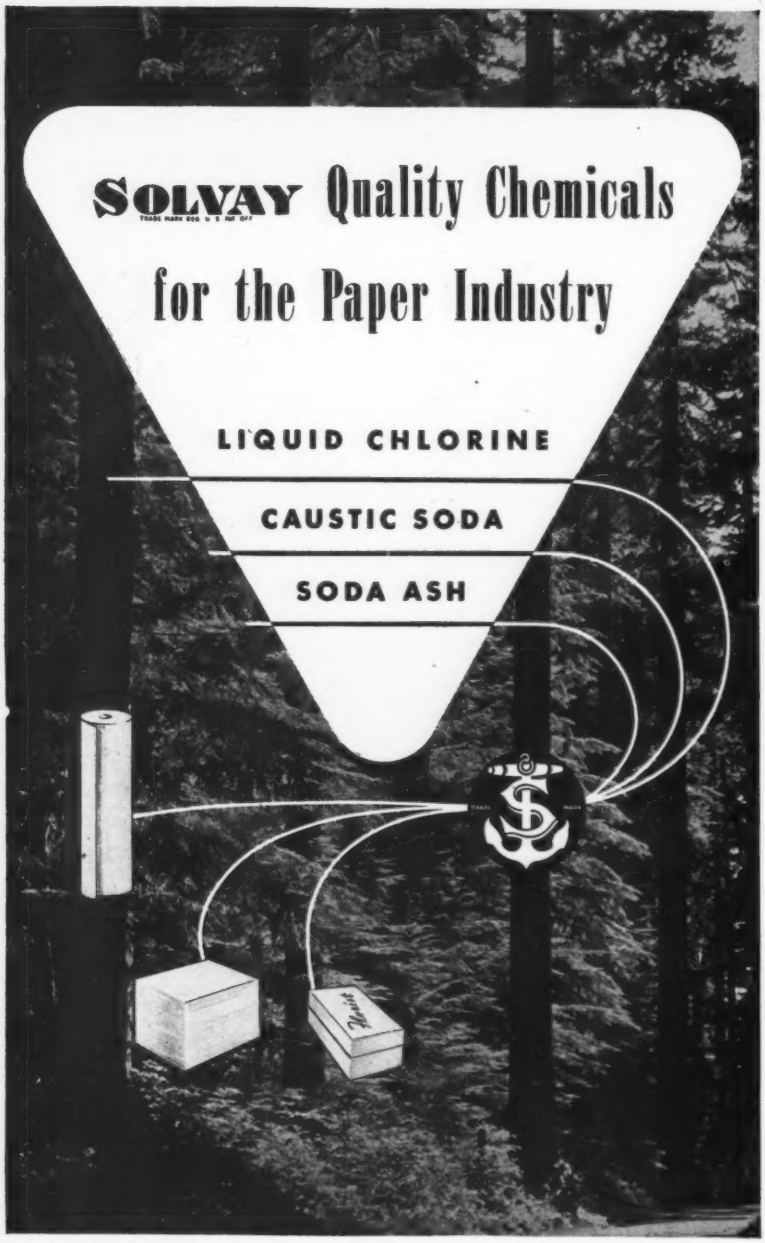
Hovey Enters Oxford's Manufacturing Department

RUMFORD, Me.—Hugh J. Chisholm, President of Oxford Paper Company, has assigned Philip L. Hovey, a member of Oxford's sales department and advertising manager to the manufacturing department. Mr. Hovey will assume his new duties as an assistant to Donald Appleton, who is in charge of manufacturing, on March 1.

Mr. Hovey has been associated with Oxford for ten years and worked in the company's mills at Rumford, and at West Carrollton, Ohio, before entering the sales department in New York in 1940. He came to Oxford after graduating from the Sheffield Scientific School of Yale University with a Bachelor of Science degree. He is a member of The Paper Club of New York and The Boston Paper Trade Association.

IPCO Plant Wins Safety Prize

NIAGARA FALLS, N. Y. — The Niagara Falls plant of International Paper Company has received an award for a perfect score during the final quarter of 1947 in the accident prevention campaign conducted by Associated Industries of New York State.



SOLVAY SALES DIVISION Allied Chemical & Dye Corporation 40 Rector St., New York 6, N. Y.

New Folder Welcomes Nekoosa Office Visitors

PORT EDWARDS, Wis. — Nekoosa-Edwards Paper Company has expanded its folder entitled "Glad to See You," that since 1946 has helped break down the air of strangeness that often accompanies a visitor's first call, and now a more comprehensive folder, entitled "Welcome to Nekoosa-Edwards," has been prepared for distribution to Nepco visitors.

The new folder is a four-page brochure measuring 4 x 5½ inches, and is lithographed in green and black on Substance 32 white Nekoosa Ledger. Cover illustration shows sketches of the company mills at Nekoosa and Port Edwards, and the title, "Welcome to Nekoosa - Edwards," against a background of a reel of paper. The Nekoosa Fine Paper and Nepco Specialty Papers seals appear on the outside back cover.

Inside copy announces, "Welcome to Nekoosa-Edwards! We are glad you came to call on us—and we'll do everything we can to make your visit pleasant. We like to see all visitors as soon as we possibly can, but sometimes there are unavoidable delays. If the party upon whom you are calling does not see you within ten minutes, please ask the receptionist to announce you again." Locations of rest rooms, telephones, reading and writing facilities of the Conference Room, and the Paper Inn restaurant are told in the folder.

Another feature of the new welcome folder is the inclusion of a "Who's Who" among Nepco personnel. A listing of administrative, sales and manufacturing departmental heads appears in the center spread of the folder so that visitors may become acquainted with the names and duties of personnel they may wish to see. A bit of early company history and a listing of Nekoosa-Edwards mill brand papers also appear in the brochure. Distribution of the folders is effected through the main office receptionist, Miss Bonnie Wood, who hands each visitor a copy on his

Tissue Still Tight in Wisconsin Cities

APPLETON, Wis.—Bathroom tissue is a scarce article in most Wisconsin cities, with a few merchants offering rolls purchased on the black market to meet demands of patrons. Wholesalers report that the bathroom tissue situation has been tight for a year, and in some stores the situation has become acute during the last few weeks.

One wholesaler blamed the OPA for the shortage. He said it set ceiling prices too low and forced mills to shift to other kinds of paper, such as napkins and facial tissues, upon which a greater profit could be made. Other dealers thought the OPA had little to do with the situation, but agreed that the other types of manufacture were more profitable.